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CLAWS Journal

CENTRE FOR LAND WARFARE STUDIES

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CLAWS Journal is published by the Centre for Land Warfare Studies (CLAWS), New Delhi. CLAWS is an independent Think Tank dealing with national security and conceptual aspects of land warfare, including conventional & sub-conventional conflict and terrorism. CLAWS conducts research that is futuristic in outlook and policy oriented in approach.

For submission of articles, commentaries, review articles and book reviews, please see "Notes for Contributors" given at the end of the Journal.

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CLAWS Vision: To establish CLAWS as a leading Think Tank in policy formulation on Land Warfare, National Security and Strategic Issues.

Contents

Note from the Editor

This edition of the CLAWS Journal, Winter 2023, is dedicated to the memory of Late Brigadier Narender Kumar, SM, VSM (Retd), a recipient of the CLAWS Scholar Warrior award of 2021 and a Visiting Fellow at CLAWS. His contribution to CLAWS was immense and distinctive and shall forever be remembered. This edition carries eleven articles on the overarching theme of defence and national security, with contributions from strategic experts and practitioners in the field. These articles give our readers a balanced and researched view of issues related to India's strategic interests, geopolitical developments in our neighbourhood, and measures for developing comprehensive national power and defence capability development.

That the year 2023 has been exceptional is an understatement. The year witnessed the continuation of the war in Ukraine which is reshaping the strategic alignment of Europe and in February 2024 will have lasted for two years.

In the Middle East, a long-festering intractable dispute conflagrated once again, but in an unprecedented manner, when on 7 October 2023 Hamas debouched from Gaza into Israeli communities in its vicinity spreading death and mayhem. The resultant Israeli reaction has plunged the region into chaos and suffering.

Both conflicts are bringing out new lessons in force application and tactical employment of men, weapons and technology which defence practitioners have to study and draw lessons from. This is essential because the manner in which these conflicts are taking place is turning many dogmas on their head. The primary one being to reduce armies and stocks of warfighting material because wars of the future were expected to be short. It appears that a quote from the 30th

President of the US, Calvin Coolidge appears to have been reinforced which says, "the only hope of [winning] a short war is to prepare for a long one".

A secondary one is that hybrid wars are the new normal. War now encompasses both conventional and non-conventional. There is only one kind of war.

With the above tenor, the first article "The Future of Land Warfare" is by Lieutenant General AK Singh (Retd) a former Army Commander in Southern Command and Lieutenant Governor of the Andaman & Nicobar Islands and Puducherry. Having been at the helm of affairs in doctrinal and executive fields the author is eminently qualified to write on this subject. The author explains how and why the future where it concerns Land Warfare is not "Black & White", but many shades of grey.

The next article, "Smart Maritime Power for India's Military" by Commodore Anil Jai Singh, IN (Retd) a well-known maritime analyst, brings out why the integration of India's maritime power in the country's security matrix will be a pre-requisite to shape the future contours of the region. Air Marshal Anil Khosla a former Vice Chief of the Air Staff writing on "Air Power and War Endurance in the Indian Context" carries out an analysis bringing out that Air Power in prolonged conflicts must demonstrate resilience, adaptability, and effective resource management to endure the challenges associated with extended durations of war.

Lieutenant General Arun Sahni (Retd) a former Army Commander South Western Command writing on "Recent Developments in Tibet and Xinjiang: Implications for India" states that it is necessary for India to be aware of the socio-economic and infrastructure changes in China's bordering autonomous regions of Xinjiang and Tibet, that have an impact on its war waging capabilities. This article then studies the transformational changes underway in these two bordering regions that directly affect India's security.

Admiral Thisara Samarasinghe a former Chief of the Sri Lanka Navy has written the article "Island Nation Adapting to Challenges from Great Power Contestation". He explains the numerous techniques island nations might adopt to align to challenges not only from the great powers but also from other regions.

Writing on "Rising Role of OSINT in Conflict/War", Major General Sanjay. P. Vishwasrao brings out that OSINT with a high level of civil-military synergy is making major contributions in all periods of conflict, stages of war, and spectrums of war. He brings out how India needs to structure and strategise to win every technology-driven competition in peace and war. Major General PK Chakravorty, an acclaimed writer especially on artillery, pens the article "Massed Fires to Precision: Is the Balance Shifting?" He brings out that we should gradually enhance our Precision Fire content while using Massed Fire as the main component till our Intelligence, Surveillance and Reconnaissance capabilities are state of the art. An optimum mix would balance cost with success in operations.

The article "Securing India's Security Interests in a China-Taiwan Conflict" by Captain Kamlesh K. Agnihotri (IN) (Retd) provides a brief overview of the evolving India-Taiwan relations; assesses the contours of China-Taiwan conflict; investigates the effect of such a contingency on India's interests in terms of quantum and intensity and finally analyses the options available to New Delhi to mitigate, if not wholly address the consequential challenges. Commodore Sarabjeet S. Parmar's article, "Amphibious Operations: Do We Need a Hard Reset?" brings out that over time the complexity of amphibious operations has increased due to modern technology and weapons which has necessitated a high degree of joint planning and flexibility of execution. The author carries out an analysis of amphibious operations in the contemporary context and examines if there is a need for a hard reset.

The article "AI and the Potential to Create Digital Twins to Transform Military Logistics" by Colonel Munish Tuli, Senior Fellow at CLAWS proposes that all military equipment (embedded with sensors) and military depots in the Indian Army should have their AI digital twins created to facilitate predictive maintenance and AI-driven demand forecasting respectively.

The final article is by Lieutenant General DS Hooda. A former Army Commander Northern Command he writes on "Utility of Military Force in Achieving India's Strategic Objectives". The article analyses 'Military Force' in the present context and then goes into the specific Army sphere. It gives broad recommendations for managing India's army to meet the current and future, conventional and asymmetric threats.

Finally, two books are reviewed as a review article and a book review. The review article by Govind Nelika, Web Manager cum Researcher, CLAWS, reviews "Leadership: Six Studies in World Strategy" by the renowned statesman Henry Kissinger. The next review is by Dr Shushant VC Parashar, a Research Fellow at CLAWS, who reviews the timeless classic "Romance of the Three Kingdoms" by Luo Guanzhong.

Happy Reading and as always, we look forward to your feedback and suggestions.

Managing Editor

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The Centre for Land Warfare Studies (CLAWS), New Delhi is an Independent think-tank dealing with national security and conceptual aspects of land warfare, including conventional, sub-conventional conflict and terrorism. CLAWS conducts research that is futuristic in outlook and policy oriented in approach.

The vision of the CLAWS is to develop a 'strategic culture' to bring about synergy in decision making both at national and operational levels. Since its inception, CLAWS has established itself as one of the leading 'think tanks' in the country. To achieve its vision, CLAWS conducts seminars (at Delhi and with commands), round table discussions and meetings with academia and intellectuals of strategic community both from India and abroad. CLAWS also comes out with a number of publications pertaining to national and regional security and various issues of land warfare.

Members are invited to all CLAWS seminars/round table discussions (details regarding impending events are communicated to all members through e–mail. Information also available on our website, http://claws.in). For the benefit of members, who cannot attend various events, reports are forwarded through e-mail. Members are sent copies of the bi-annual CLAWS Journal & Scholar Warrior, occasional (Manekshaw) Papers and given membership of the CLAWS Library. From 01 January 2020, certain occasional papers would be made available to the members digitally only.

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The Future of Land Warfare

AK Singh

 "When it comes to predicting the character and location of our next conflict; since Vietnam our record has been perfect, we have never once gotten it right."

—Robert Gates, US Secretary of Defence, (2006-2011)[1]

Abstract

Predicting 'Futures' is a hazardous business, especially where it concerns the "Future of Land Warfare". Militaries have mostly not been able to predict the future correctly. Yet, despite this dismal record, most militaries are seriously in the business of outlining the future as it would unfold a couple of decades hence. This is necessary because there is a lead time that is required to build what will be needed one to two decades later. This is certainly true of developing next-generation weapons and equipment, but equally applies to the development of doctrine, strategies and organisations that will be relevant in the future. The future we see is not "Black & White", but many shades of Grey, as this article will explore.

Introduction

The first step to preparing for future war and conflict is to have a clear understanding of how warfare has evolved in modern times. We normally

Lieutenant General **AK Singh,** PVSM, AVSM, SM, VSM (Retd) is Former Army Commander, Southern Command and Former Lt Governor of Andaman & Nicobar Islands and Puducherry. The author was involved in the origination of the Integrated Battle Group (IBG) concept in 2008-2009 as the Director General Perspective Planning. Views expressed are personal.

> **War has an enduring nature that demonstrates four continuities: A political dimension, a human dimension, the existence of uncertainties and that it is a contest of wills.**

use the words 'nature and character of warfare' in a rather casual manner, mixing one for the other. Hence, as this article starts delving into the subject, it is important to understand these two words in their correct context.

Nature of War. The nature of War describes its unchanging essence, that is, those things that differentiate war (as a type of phenomenon) from other things. War's nature is violent, interactive and fundamentally political. War has an enduring nature that demonstrates four continuities: A political dimension, a human dimension, the existence of uncertainties and that it is a contest of wills. Finally, War is always a matter of policy, as the political objective will always determine, both the military objective and the amount of effort it requires.

Character of War. Conversely, warfare has a constantly changing character: every war exists within a social, political and historical context, giving each war much of its unique character i.e., levels of intensity, objectives, interaction with the enemy etc. In simple words, the means by which war has to be fought i.e., the context is again paramount. Technology has a significant influence on warfare, but other influences like doctrine and organisation are also important. Changes in the character of war may occur slowly over generations or take place rapidly.

Evolution of Land Warfare—Defining Events of the 20th Century

Before moving to the future, a brief overview of how land warfare evolved in the 20th century is essential because the past does show a mirror to the future, even if not very accurately. While opinions may vary, but broadly there were four defining events in the 20th century, relating to war and conflict. These are given in brief in the succeeding paragraphs.

The 1st World War (1914-1918). In many respects, this war was the first truly global and modern war, where technology was put to great destructive ends. The war was characterised by trench warfare where horrendous casualties were caused for gains of a few yards. This war not only saw the demise of massed cavalry charges but was also a war of many firsts; aeroplanes, tanks and submarines made their appearance. But what also had a profound effect on the conduct of future warfare was the very large number of casualties, millions died in the trenches, reflecting the total bankruptcy of doctrine, strategy and innovative ideas on either side. This in fact set the stage for the evolution of war as it was waged in the next world war.

The 2nd World War. For any serious student of the art of war, a deep study of the 2nd World War is a must. So far, the world has not seen a war at that scale. The advent of nuclear weapons led to the finale of the 2nd World War. The interim period between the two world wars had been a crucible of new strategies and new technologies. Prominent was the coming of age of 'Manoeuvre Warfare and the Combined Arms Concept'—resulting in the German Blitzkrieg of 1940—followed by the wide sweeps and encircling manoeuvres of Operation Barbarossa and later the great counter-offensives by the Soviets post Stalingrad and the Allies post Normandy. These operational manoeuvres were greatly facilitated by the non-linear leaps of technology in all three domains i.e., land, sea and air. The tank and the aircraft came to symbolise the new currency of power, whilst aircraft carriers and submarines ruled faraway shores. This war proved to be the deadliest of all conflicts causing 25-30 million military casualties and another 50 million civilian casualties. At Leningrad and Stalingrad, there were around 1.5-2 million casualties each, a figure unimaginable today. The Russian capacity to suffer and accept casualties during this war has no parallel.

Advent of Nuclear Weapons. In the race to be the first to develop a nuclear weapon the USA beat Germany, otherwise, world history

> **So far there is a general consensus that nuclear weapons are more for deterrence than for warfighting; but risks are growing by the day, the Russia-Ukraine conflict being the latest danger spot.**

may have been different. At its peak, the Manhattan Project (the code name for America's development of atomic bombs) employed 1,30,000 Americans at 37 facilities across the USA.[2] The use of two of these weapons at Hiroshima and Nagasaki brought down the curtain on the 2nd World War. Today there are 7 declared nuclear states and two covert ones i.e., Israel and North Korea. On 9th September 2022 North Korea passed a law to declare itself a nuclear state and rejected any possibility of de-nuclearisation.[3] Nuclear weapons brought in nuclear deterrence which has seen three distinct phases. These were:

- **Deterrence 1.0.** Which governed the US-USSR nuclear and space rivalry, and was characterised by 'Arms control agreements' and efforts to curb global proliferation, though the world almost came to the brink in the 1962 Cuban crisis.
- **Deterrence 2.0**. This was characterised by the post-Cold War era of unipolarity, when the USA largely defined the global nuclear agenda.
- **Deterrence 3.0.** With the resurgence of Russia and China's arrival on the world stage, in Deterrence 3.0, the world has entered a more dangerous era, where multi-polarity is challenging US dominance and today Russia is the holder of the largest nuclear stockpile.

So far there is a general consensus that nuclear weapons are more for deterrence than for warfighting; but risks are growing by the day, the Russia-Ukraine conflict being the latest danger spot.

The Cold War and its Aftermath. The Cold War and the Western policy of containment is well known. Whilst the policy ensured peace between the great powers, it resulted in many proxy and peripheral wars

across the globe. The collapse of the Soviet Union resulted in American unipolarity and uncontested conventional superiority; with Operation Desert Storm reflecting the pinnacle of third-generation manoeuvre warfare and air-land doctrine.

The stunning success of Operation Desert Storm was to shape world military affairs for decades to come. The air supremacy and efficacy of American precision weaponry convinced most adversarial countries and non-state actors that they could not hope to compete with the United States in conventional warfare, thus turning their focus to 'Asymmetric warfare' tools, devising new tactics and weapons that impeded the use of high technology. Thus, the post-Cold War era has been characterised by a new emerging paradigm, combining hybrid warfare and beyond the traditional, new generation warfare and emerging battle domains.

The Indian Experience Post 1947

Unlike other European continental armies like Germany, France, Russia and even the USA, who had recognised the importance of operational art (the intermediate level between strategy and tactics) and manoeuvre warfare, the British Army and the British Indian Army remained wedded to old tactics and attrition warfare.

This is the army we inherited in 1947, more comfortable in defensive operations, with an autocratic detailed orders leadership ethos. And this affair continued right till the 1962 debacle, which exposed the hollowness of our military thinking, as well as the inept senior military leadership. 1962 was a wake-up call that led to a renewed focus on defence. Even the 1965 Indo-Pak war was at best a stalemate, which jolted us further.

The 1971 war was a redemption of both civil and military leadership, of a whole of Government approach and tri-Service cooperation, which resulted in a spectacular victory. But unfortunately, it did not result in institutional changes in military thought or leadership style.

> **Suicide bombers compensate for their military inferiority by giving up any chance of survival. A new perverse form of heroism has developed, which "post-heroic" societies are ill-prepared to deal with from a military or psychological point of view.**

The 13th COAS Gen K Sundarji (Feb 1986-May 1988) brought in sweeping changes in the eighties, with the induction of T-72 tanks and BMP AFVs along with a focus on combined arms concept and manoeuvre warfare. While the mechanised forces did imbibe this change with large-scale exercises, the rest of the army remained occupied with proxy war and CI operations, which has frozen mindsets further.

Unfortunately, in a recent reorganisation of the Integrated HQ of the MoD (Army) after seamless integration, armour and mechanised infantry have chosen to bifurcate and go their separate ways by having separate directorates. This is most unfortunate as it goes against the very concept of integration.

New Paradigms in Military Affairs

Emergence of Non-State Actors. The perceived traditional characteristics of modern warfare received a jolt with the emerging presence of non-state actors. This was best exemplified by the proliferation of terrorism and suicide bombings. A return to the forms of war, which nationalisation of warfare had brought to an end in the 16th and 17th centuries, and replaced them by a disciplined military organisation, can already be observed. Civilian targets are now, more and more taking the place of military objectives, starting with towns and villages overrun and despoiled by militias and war lords and extending to the symbols of political and economic might, that were targeted in the US by terrorists on November 9, 2001. Suicide bombers compensate for their military inferiority by giving up any chance of survival. A

new perverse form of heroism has developed, which "post-heroic" societies are ill-prepared to deal with from a military or psychological point of view. Non-state actors and terrorists are unlikely to achieve the power to destroy developed nations but will continue to cause anxiety, selective harm and sometimes, immense psychological collateral damage.

Hybrid Warfare. This is a military strategy that blends conventional, irregular and cyber warfare. This approach to conflicts is a potent and complex variation of warfare. It can also be used to describe the flexible and complex dynamics of the battle space requiring a highly adaptable and resilient response. The hybrid threat concept represents the evolution of operational art and a potential paradigm shift, as a doctrinal and organisational Revolution in Military Affairs (RMA). As an unrestricted collective methodology, the hybrid concept bypasses the cognitive boundaries of traditional threat characterisation and the application of organised collective violence. As such, the hybrid construct presents numerous implications for visualising the future operational environment and how militaries should formulate strategies and resource investment priorities in the future.

Emerging Battle Domains and Battle Spaces. War and conflict have been and will remain intrinsic to the human DNA; only the form and instruments will continue to change with an ever-increasing rapidity. Post the Cold War, there has been a paradigm shift in the very character of conflict. Modern-day conflicts are not merely confined to States but have expanded to include sub-nationalities, non-state actors, terrorists, religious fanatics and ethnic interests. The battle space has expanded to include space, cyber and cognitive domains in addition to the traditional three-dimensional air, land and sea domains. The manifestations would encompass, non-kinetic confrontations as seen in Ladakh recently, non-contact warfare, contract warfare and traditional armed conflict in its hybrid avatar, under an informational gaze.

Technology. This is influencing the multi-domain battle space like never before. The 4th industrial revolution is characterised more by the fusion of technologies, that is blurring the line between the physical, digital and cognitive spheres. Applications involving Artificial Intelligence (AI), quantum computing, machine learning, nano technology and genetic engineering riding on communication highways have very distinctly impacted the character of 21st-century warfare.

AI and Robotics. Humans are being rapidly replaced by AI due to sight and processing-related limitations and a lack of pure logic in decision-making. There are myriad ways in which robotics is making inroads, with drones and swarm bots becoming increasingly popular. It is also becoming rather simple to weaponise the existing autonomous drones and as such, one has to be prepared for lethal autonomous weapons systems (LAWS), especially since attempts to regulate such systems have yielded no progress. The serious legal and ethical issues that arise consequent to the remotely controlled drone strike on Iranian Maj Gen Suleimani have also contributed to the lowering of the threshold of war. It's about the Robotics Revolution unfolding before our eyes, and we are late starters!!

Long Range Vectors and Precision. Some trends in technology that are going to reshape how fires are delivered are extended ranges, automated fusion, multi-sensor active seekers, precision weapons along with the development of hypersonic weapon systems. Corresponding defensive systems and measures are also keeping pace.

A Reality Check for the Future

Just as every military expert thought that he had a measure of the future of land warfare i.e., a combination of Hybrid and New Generation Warfare with a very remote possibility of state vs state conventional war, came the reality check of the Russia-Ukraine conflict, which has turned most recent hypotheses on its head and has alarm bells ringing all across the globe,

especially in developed countries. But the picture of the future of land warfare that emerges is not black and white, but many shades of grey. Some examples below illustrate this trend.

Killing of Iranian General Suleimani. On 3 January 2020, a US Drone strike near Baghdad airport provided a glimpse into the future of unmanned aerial systems, both

> **Russia has almost neutralised the drone threat, which appeared so potent in the initial phase, with a combination of surveillance, prophylactic fires, air defence and electronic warfare capabilities.**

unarmed and armed. This killing, some call it an "assassination", has also raised questions of legality and morality. There is as yet little unanimity on how to codify the use of such remote systems.

Drones to the Fore in Syria and Armenia-Azerbaijan conflict. This conflict of 44 days from September 27 to November 10, 2020 resulted in a victory for Azerbaijan. The Azeris did not command the air but the ability of their drones to exploit specific gaps in Armenian air defence enabled them to cause havoc on the battlefield. While Armenia only fought with tanks and artillery, Azerbaijan relied heavily on drones, mainly the Turkish Bayraktar TB2 and the Israeli Kamikaze drones. The expanding array of relatively low-cost drones can offer countries air power at a fraction of the cost of maintaining a traditional air force. But drones also have severe limitations and great vulnerabilities, as has been proven in the later phases of the Ukraine conflict, where Russia has almost neutralised the drone threat, which appeared so potent in the initial phase, with a combination of surveillance, prophylactic fires, air defence and electronic warfare capabilities.

American Withdrawal from Afghanistan. After 20 years of military presence in Afghanistan the sole superpower US, along with its allies quit Afghanistan in a humiliating manner, virtually handing over the country back to the Taliban. This also reflected the limitations of modern military

power against primitive foes, who refused to fight the Americans on their chess board.

India-China clash in Ladakh in 2020. Despite existing Peace and tranquillity Agreements, Indian & Chinese troops clashed along the LAC at several points in Ladakh. Not a shot was fired, but it was primitive clashes, aggressive melee, face-offs and skirmishes, which resulted in a number of casualties on both sides. Two nuclear-armed neighbours with modern armed forces clashed with primitive means.

The Russia-Ukraine conflict in 2022-23. This war has confounded most military experts, who had predicted the demise of conventional state vs state wars in the 21st century. And what an amalgam of the character of war it has turned out to be; combining 2nd, 3rd, 4th & 5th generation warfare, high and low technology; new generation warfare, political, economic and energy wars, prosecuted by modern armed forces and militias, by contract mercenaries and proxies. You name it and it is there. The NATO Supreme Allied Military Commander has said that the war in Ukraine is very different which requires different levels of readiness, it requires different force models, it requires different tactics and Operational Art and different equipment. He virtually admitted that NATO is not organised, equipped or trained presently for this type of warfighting.[4]

Gaza. The unthinkable happened on October 7, 2023, when the almost invincible Israeli Defence Forces, with an elaborate high technology barrier and intelligence were totally surprised by Hamas, pushing the whole region into turmoil. It appears that warfare has taken a shape where high technology has finally met its match.

Future of Land Warfare

Against such a backdrop, it's difficult to predict specific future scenarios for 'Land Warfare'. Historically also armed conflicts have become too complex to allow the luxury of prediction. Yet 'Status Quo' is not the

answer. Hence, this article will attempt to look at distinct pointers for the future of land warfare based on firm analytical foundations. These can form the basis for armed forces to prepare for the future, keeping in view the context and the environment.

Though victory can be very costly in modern conflicts, it invariably accomplishes far less than it is intended to achieve and is no longer related to the means employed.

Notion of Victory. Though victory can be very costly in modern conflicts, it invariably accomplishes far less than it is intended to |achieve and is no longer related to the means employed. Victory in the 21st century may be seen in the context of achieving or denying an adversary politico-military objectives/end states at least cost, and thus indicative of a better outcome than what existed before the war. The notion of victory is no longer a product of 'Decisive Battles' but may be linked to a notion of having the will and the means to retain the status quo, or at best a more favourable bargaining position. Iraq, Afghanistan, Syria and Ladakh are clear examples. While the above may be true for most theatres in India, in India's Southern theatre there is still scope for decisive outcomes, through the capture of territory and/ or destruction of war-waging potential. Our overall military strategy should optimise this, South of the Satluj river. More important, the military aims and strategies should be in harmony with the Politico-Strategic aims.

The primacy of Land Warfare. Speaking recently the Indian Army Chief stated that, "land will remain a decisive domain in warfare, especially in our case where we have contested land borders. Therefore, the notion of victory will also remain land-centric".[5] Speaking at the RUSI land warfare conference in June 2022, Lt Gen Sir Patrick Saunders, Chief of the UK General Staff opined: "The war in Ukraine also reminds us of the utility of land power. It takes an Army to hold

and regain territory, as also defend the people who live there and it takes an Army to deter". This has been borne out in various recent conflicts including India-China clashes in the high Himalayas. So most armed forces which downsized their armies in favour of other battle domains are now having to reconsider. India has to be cognizant of this basic fact and ensure that the priorities of the Indian Army have primacy over other competing claims.

Limitations of Deterrence. The Ukraine and the Israel-Hamas conflicts have also highlighted the limitations of deterrence by punishment, and have reinforced the importance of deterrence through denial. It is important to be in control of territory to deny it physically rather than a notion of denying it through punishment, as was the case hithertofore. We have to find an answer to this challenge, for it would be inadvisable to have a large portion of the army committed to border guarding duties.

Legacy Systems. These will co-exist with niche technologies and will be optimised for greater effect, though a combination of the two. Whilst new weapon systems will continue to be inducted, upgradation and modernisation will still be the most cost-effective way to the future. We have an excellent tank in the T-90 which was inducted in 2001-2002. Two major add-ons for this tank have been lingering for the past two decades—an uprated engine and an active protection system like Shtora or Arena. Similarly, many upgrades are pending for the mechanised infantry, artillery, air defence, engineers and others.

Firepower vs Manoeuvre. The inter se relationship between firepower and manoeuvre is dynamic, with the scales weighing towards manoeuvre thus far. But the lessons of recent conflicts, especially the Russia-Ukraine war has reinforced a greater thrust on fire-power, more so where the adversaries are almost matched in capability and scale. This is so because of the transparency of the battlefield and the increasing vulnerability of large-scale manoeuvre. The thrust is more towards long-

range Precision Guided Munitions (PGMs), whilst massed artillery still retains its salience. However, in open terrain, the relationship will be more evenly matched, with manoeuvre still retaining an edge in the breakout phase, albeit under an overarching Air Defence (AD) cover, with firepower taking precedence in the break-in phase and towards the terminal objectives.

Future of the Tank and the Combined Arms Concept. Despite periodic obituaries, the tank will continue to be the centerpiece of future battles albeit as part of a combined arms team. In fact, we may see the development of more advanced tanks incorporating niche technologies, with a greater focus towards protection at the cost of mobility. The combined arms team, with subtle changes, will still be the guiding operational philosophy for offensive employment of conventional capabilities. One change would certainly be the creation of anti-drone capabilities based on a combination of surveillance, AD, EW and long-range PGMs. In fact, the time has come to go beyond the combined arms to a multi-domain Integrated Force, combining multiple sensors and shooters, thus executing destruction in depth.

Urban Warfare to the Fore. The wars of the 21st century have brought the focus back on conflict amidst urban terrain. The battle of 'Bakhmut' in Donbas has turned out to be a meat grinder, a mini-Stalingrad. The developed terrain of Punjab on either side of the Indo-Pak border would involve similar urban warfighting. In addition to the problems posed to traditional land forces, the urban battlefield decreases the advantages of joint force integration, especially traditional air power. Instead, UAVs, PGMs and other niche technologies are better suited to fill the gap. Lastly, in urban warfare, there is no substitute for the Infantry, without whom you cannot fight urban warfare. However, the Indian Army's methodology for operating in this dense environment has not changed significantly. It will have to, and the sooner it is done the better it will be.

> **The era of Intelligence is slowly being replaced by 'Predictability and Precognition', leading to pre-emption using the power of AI and quantum computing.**

Niche Technologies. Such technologies especially in cyber and space are coming to the fore. Wars of the 21st century have shown that "small, smart and many" could dominate the "few and large". The transparency of the battle space has acquired a new dimension. The era of Intelligence is slowly being replaced by 'Predictability and Precognition', leading to pre-emption using the power of AI and quantum computing. The American prediction of Russian operations in Ukraine in February 2022 is a good example. India would have been better placed had we been able to predict the Chinese foray into Ladakh.

Grey Zone Challenges. Though not specific to land forces, Grey Zone challenges have become the order of the day and their frequency is bound to increase in the future. Grey Zone conflict is best understood as an activity that occupies the conceptual space between peace and war and may involve political and economic warfare, sabotage, armed proxies and even creeping military expansionism, China style. Durable disorder is the fundamental objective of Grey Zone conflict. It also challenges moral and ethical thresholds and undermines laws of armed conflicts and ethics of warfighting. In future conflicts, there will be a greater focus on morality issues, human rights violations, humanitarian corridors and war crime accusations, some of which will be motivated, as seen in the Russia-Ukraine conflict. In the Indo-Pak context, Jehadis will continue to be used by Pakistan, both in peace and war.

The Integrated Battle Group (IBG) Concept

For a layman, the Indian Army's proposed Integrated Battle Groups (IBGs) are supposed to be lighter than a divisional organisation. The IBG is a concept of warfighting, not just the breakdown of the division into

a smaller organisational construct. The key is to tailor-make the IBGs to suit various operational requirements and not make them a standard fit for all. The IBGs should be empowered with niche technologies, including for cyber, space, and 3rd dimension capability including drones and anti-drone capability (combining recce/surveillance, Air Defence and electronic Warfare). The IBG concept is to be applied selectively and not across the board. Select divisions have great utility and need to be retained, their operational usefulness having been re-established in recent wars.

Conclusion

Today and in the foreseeable future, India is faced with a combination of threats. These are the legacy land threats on both flanks, from China and Pakistan who are also in strategic cahoots, posing a classical two-front dilemma. In addition, India also faces Grey Zone and Hybrid Warfare, especially on the China front. In developing and justifying capabilities against such unpredictable challenges, each Service in the Indian context is assuming its own matrix of threats, whereas the threat is now Multi-Domain. So far, our response, in most cases appears to be reactive. We must now prepare a multi-domain anticipatory strategy and focus on capability development towards that end. In addition, we need to enhance our sustenance capability, for future conflicts may not be as short as planned for thus far.

Whatever the scenario, if we have a war with Pakistan, it must be fought on Pakistan soil. In the case of China, we have to be prepared for a high-technology war in depth, combined with traditional armed conflict on the LAC. We need to be prepared both physically and psychologically. Whilst conventional operations will remain relevant, military leaders must re-conceptualise war to keep pace with its changing character. Human-machine interface is the way forward, where drone warfare and other niche technologies will reinforce legacy systems on an

attrition and firepower-dominated battlefield. We need military leaders who have a good understanding of technology and who can ensure the delicate balance between 'Reflection and Action'. For the Indian Army to remain 'Future Ready' the pace of change within must outpace the change outside.

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Smart Maritime Power for India's Integrated Military

Anil Jai Singh

Abstract

The importance of maritime power as the determinant of global power needs no emphasis. India is a maritime nation with its future inextricably linked to the sea. However, due to a continental-centric approach to national security, the maritime domain has not got its due attention. With the maritime orientation of the Indo-Pacific and the likely great power contestation in these waters, India's maritime power will have a critical role to play in shaping the outcome on land. Technology will have a large role to play across the entire spectrum of conflict, both, in the maritime domain as well as on land; militaries will have to adapt these as effective force multipliers both in planning and prosecuting the conflict. The integration of the country's maritime power in the country's security matrix will be a prerequisite to shape the future contours of the region.

Introduction

Maritime power has always been a critical and decisive element in shaping global power equations. Through the pages of more than two millennia of history to the more recent times of two world wars, a four-decade-long

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The current shift in the global geopolitical centre of gravity from the Euro-Atlantic to the Indo-Pacific also has a distinct maritime orientation.

Cold War and innumerable regional conflicts, the course of events in the maritime domain have often influenced the outcomes on land with maritime superiority being the key to global dominance. The 21st century is no different and has been referred to as the century of the Oceans. The current shift in the global geopolitical centre of gravity from the Euro-Atlantic to the Indo-Pacific also has a distinct maritime orientation. Ninety per cent of global trade travels over the oceans in an increasingly interconnected world with trade dependencies and critical supply chains transcending geographies. Humankind has already begun turning to the seas for its future sustenance as the effects of climate change and global warming play havoc on land. This dependence is going to grow exponentially till the end of the century. It is also evident that the emerging great game for global supremacy is going to be played out in the oceans, and as far as India is concerned, uncomfortably close to home.

As this paper is about 'smart' maritime power, there are two major differentiations in interpreting that term which merit highlighting. The first is the difference between the widely accepted definition of smart power and the focus on 'smart' power in this article which has a more military connotation; the second is the difference between maritime power and naval power—in this case, the focus will be on the latter.

Smart power is commonly defined in the contemporary geopolitical discourse as the ability to combine hard power and soft power resources into effective strategies.[1] As Alan Chong in his essay on Smart Power writes, "Smart power supposedly heals with the velvet-gloved hand of policy while judiciously resorting to the mailed fist only when extreme circumstances warrant it."[2] However, in the context of this article, smart

maritime power will be described to highlight the smart utilisation of the country's comprehensive maritime resource, be it civilian or naval, as an important constituent of an integrated military. Here it is important to emphasise that the focus inevitably will be more naval-oriented.

India's Maritime Credentials

India is essentially a maritime nation with its security and economic sustainability dependent on the sea. Its strategic location astride some of the most critical international sea lanes (ISL) and its peninsular tip jutting almost 1,000 miles into the Indian Ocean gives it a pivotal position in the Indian Ocean. The Andaman and Nicobar Islands straddle the approaches to the strategically significant Straits of Malacca through which most of the trade and energy flows into the Pacific and feeds the dragon's insatiable appetite for energy and resources. China sees this as a critical vulnerability which has led to this being termed as its Malacca Dilemma. To mitigate this vulnerability, it is establishing connectivity to its mainland directly from the Arabian Sea and the Bay of Bengal through the China-Pakistan Economic Corridor (CPEC) from the Pakistani deep-water port of Gwadar and Myanmar's deep-water port of Kyaukpyu[3] respectively. A favourable maritime geography provides the Indian Navy with a commanding presence on its eastern and western seaboards to degrade the economic lifelines and war-waging capability of both its principal adversaries.

India's maritime assets—a coastline of 7,516.4 km, an Exclusive Economic Zone covering more than 2 million sq km, and the strategically located island territories on the western and eastern seaboard are also a vulnerability. Successfully protecting and defending these from the wide spectrum of traditional, non-traditional and transnational security threats poses a considerable challenge. Additionally, with 90 per cent of India's trade by volume and almost 70 per cent by value being seaborne, and 80 per cent of India's oil and gas requirements being imported over the

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oceans, the security of these is critical for India's economic well-being and future development. With the Indian economy expected to cross US$ 5 trillion in the next few years and US$ 10 trillion within a decade from now, the extent of India's economic security on the sea will increase exponentially. This further highlights the importance of securing India's maritime frontiers and ensuring that its national interests in the maritime domain are not jeopardized or constrained by inimical forces.

India's Continental Bias

India's preoccupation with its adversaries across its continental borders with five wars and numerous skirmishes in the last 75 years, continues unabated with China raising tensions along the Line of Actual Control (LAC) and Pakistan with its state-backed low intensity conflict across the Line of Control (LOC) in its fifth decade, despite that country being on the brink of an economic and governance crisis.

Not surprisingly, therefore, the maritime domain, despite its critical importance and significant security challenges has failed to get the attention it deserves. It was only after the Navy's stellar performance in the 1971 war, its total domination of the Arabian Sea and the Bay of Bengal, and the effect this had on precipitating the speedy end of that war—that the Navy's worth was truly understood. Since then, the navy has been effectively deployed in the subsequent standoffs to ensure not only that the maritime threat is contained, but also to ensure that India always retains a favourable maritime situation in the Indian Ocean, and that too without firing a shot.

However, given the normal discourse that 'victory is still measured by foot' and 'boots on the ground' are the essential prerequisites to determine the outcome, the navy has come to terms with this and is not at odds with

> **The importance of the oceans makes navies an essential instrument for the state not only in war but also in peace.**

acknowledging this. However, it is perhaps the army and the air force that need to better understand India's maritime security imperatives and the significant role naval forces can play in supporting the effort on land and in the air. Hence the need for enhancing jointness in every aspect of structuring, planning and executing an operation becomes so essential. In the past, synergy between the three forces has been effectively achieved during the 1971 war for the liberation of Bangladesh, during Op Pawan in the Sri Lanka conflict and subsequently during Op Vijay (Kargil), despite the structure being single Service in nature.

Moreover, the importance of the oceans makes navies an essential instrument for the state not only in war but also in peace. They provide prosperity to the state through the protection of trade and ensuring good order on the high seas, which are otherwise outside the jurisdiction of the United Nations Convention on the Law of the Sea (UNCLOS). However, countries continue to underestimate the importance of maritime capability and naval forces. This is not peculiar only to India; history is replete with such instances of under-utilisation of maritime capability. In fact, a Swedish military pamphlet of 2004, states, in its idea of the operational concept of the future Swedish naval forces that, "Maritim verksamhet har härmed inget egenvärde utan skall ses som ett nödvändigt komplement till landoperativ verksamhe". This roughly translates into stating that maritime forces have no value by themselves but should be seen as a necessary complement to land operations. Ironically this is coming from a country with a strong maritime tradition and a strategic maritime location.

There is no doubt that the importance of navies notwithstanding, the final outcome of a military engagement, in most cases, will be decided on land. Sir Julian Corbett, one of the two doyens of maritime strategy articulated this when he said in his seminal work, 'Some Principles of Maritime Strategy', "Since men live upon the land and not upon the sea, great issues between nations at war have always been decided—except in the rarest cases—either by what your army can do against your enemy's territory and national life, or else by the fear of what the fleet makes it possible for your army to do". He also defines maritime strategy as "the principles which govern a war in which the sea is a substantial factor".

The Maritime Challenge

In India's case too, the issues with both China and Pakistan will ensure that the focus of the Indian military and polity will remain continental-centric and future outcomes will be decided across our land borders. However, the importance of the maritime domain in India's strategic neighbourhood and China's focus on developing its maritime and naval capability in the Indian Ocean to become the dominant global maritime power en route to its ambition to become the global numero uno, is going to shape the military dynamics of future Sino-Indian relations. The emerging China-US great power contestation is going to play out in the Indian Ocean where China, which is handicapped by an unfavourable maritime geography of its own, will find the sea space to project its maritime power and also get access to the Atlantic. The PLA Navy already has a permanent presence in the Indian Ocean and this is set to grow substantially by the end of this decade. Its base at Djibouti is being extended to accommodate an aircraft carrier, it has built a submarine base for Bangladesh and is in de facto control of the Pakistani port of Gwadar.

China is also foraying into the Bay of Bengal and could soon pose a challenge to India's dominant and unchallenged naval presence in

these waters. The recent operationalisation of a Chinese-built submarine base in Bangladesh called BNS Sheikh Hasina[4] will soon be less about supporting Bangladesh's two 40-year-old Ming class submarines, and more about providing the wherewithal to enable the PLA Navy to deploy its submarines into these waters, something that China was hesitant to do so far because of the logistic challenge of supporting its submarine deployments more than 9,000 miles from its mainland.

The Pakistan Navy, which had thus far largely focused its attention on developing a strong sea denial capability in the littorals to thwart the Indian Navy, is also looking further seawards to play a larger role in the Indian Ocean security matrix;[5] it has recently acquired four large frigates from China, two powerful corvettes from Turkey and is in the process of acquiring 8 Type 039 AIP fitted submarines—four directly from China and four being built indigenously[6]. While the current political instability and economic crisis in Pakistan may impact this ambitious plan, at present that seems unlikely as China will be keen to develop Pakistan as a useful proxy to contain or counter India's pre-eminent position in the Indian Ocean region.

Hence, China's focus on the maritime domain will shift some attention away from the continental predominance that has prevailed thus far. Not only will the Indian Navy have to play a larger role in projecting India's power at sea to ensure the safety and security of its maritime interests including its trade and energy security, but will also have a central role to play in influencing the larger geopolitical outcomes in the region, besides shaping the course of events on land, both directly and indirectly.

India's Military Transformation

There is an oft-repeated cliché that militaries are always preparing for the last war. While there may be some truth to that, it is not unusual for the basic tenets of warfare, or even the decisive elements to remain similar, if not the same. Navies often face the criticism that they continue to invest

Modern militaries are acutely aware of the need to adapt to contemporary technological advancements as effective force multipliers, while simultaneously adapting traditional platforms to the contemporary battlespace while retaining their fundamental capabilities and strengths.

in traditional platforms like aircraft carriers, despite the vulnerability and limited utility of these leviathans in a modern and agile navy. Armies and air forces too are subject to such criticism. Contrary to this perspective, modern militaries are acutely aware of the need to adapt to contemporary technological advancements as effective force multipliers, while simultaneously adapting traditional platforms to the contemporary battlespace while retaining their fundamental capabilities and strengths.

The Indian Armed Forces are on the cusp of a transformational shift from a traditional single Service-oriented organisation into a joint one; this includes the establishment of tri-Service theatre commands to replace the present single Service commands. Such a transformation is as much about restructuring organisations as it is about restructuring mindsets. The present theatre command structure of the US Armed Forces with joint warfighting capabilities which contribute in no small measure to the US global multi-dimensional military presence, had also required legislation. This was the now famous Goldwater Nichols Act of 1986, which enforced the Theatre structure amongst firmly entrenched single-service hierarchies that were reluctant to exit their comfort zone. Four decades later, despite its unqualified success, challenges still remain. Most contemporary militaries have adopted a joint model. In the UK the transformation, driven primarily by budgetary constraints also faces numerous functional challenges but is here to stay. Nearer home, China, has also restructured its armed forces into five theatre commands, with

the aim perhaps being to relocate these beyond its borders as the country expands its military footprint across the globe.

In India, this process is also well underway. Fortunately, it is being thought through carefully before being implemented. This restructuring will not only impact the organisational structure which is expected to become leaner, but will substantially affect the force level structuring, joint and single service capabilities and capacities, budgetary allocations, training and logistic support; in a nutshell, it will usher in a new paradigm for addressing our national security challenges. It will also have to be in consonance with the country's national security strategy and will require close coordination with the MoD and other ministries and departments of the government. Additionally, India's nuclear capability and posture will also have to be factored into determining the limit of the military's conventional capability.

However, most importantly, it will impact the direct and indirect interaction between the three Services and their ability to operate seamlessly with each other in a joint environment while optimising the complementarity of their capabilities towards shaping the final outcome. Unlike the US and UK models which are largely expeditionary and therefore the joint capabilities seamlessly merge, India has two very distinct theatres of operation—the continental, with two adversarial nuclear-armed neighbours constantly sniping at our heels across disputed borders and the maritime which appears relatively benign at present but encompasses a wide range of security challenges, each of which is detrimental to national security, and the economic well-being of the nation.

Roles of the Navy

Navies have four primary roles; these are the military, the diplomatic, the constabulary and the benign.[7] While the military role is the most important and is the raison d'être of navies in the first place, the changing nature

of the maritime security threat with a proliferation of non-traditional and transnational threats has exponentially increased the importance of the other three in the national security matrix.

Navies are not only very effective instruments of peacetime diplomacy, but can also convey a strong signal with their sheer presence in less-than-war situations. They have some distinct operational advantages in projecting the nation's power and intent in a developing situation without causing unnecessary provocation or being viewed as hostile. Their inherent mobility (a Carrier Battle Group with its integral air wing can travel up to 500 nautical miles in a day), and the ability to operate without restraint outside an adversary's territorial waters (12 miles from the shore) provide the advantage of manoeuvrability and flexibility to shape the theatre of operations. This is unique to the navy as both, armies and air forces are constrained by distinct land borders and inviolability of another's air space. While the former's mobilisation, manoeuvres and forays could be viewed as hostile, the latter's operations at the edge of the adversary's air space would also elicit alarm and a possible reaction. Navies on the other hand can launch long-range land attack missiles with precision targeting from stand-off ranges at sea to targets deep inland. The successful softening up of the land threat by Tomahawk missiles fired from US nuclear attack submarines and destroyers against Iraq, Al Qaeda, Syria, etc., greatly facilitated the ground forces in swiftly achieving their objectives.[8]

Technology as a Force Multiplier

As smart disruptive technologies get increasingly integrated into the military, they will expand the options available to the theatre commanders and a joint multi-dimensional approach will become an integral part of military planning. The application of Artificial Intelligence (AI) and other path-breaking disruptive technologies are also being integrated into the development of modern sensors with improved predictive capabilities

offering accurate target detection and identification as well in weapon systems with enhanced guidance and precision targeting at stand-off ranges based on sophisticated algorithms. Unmanned and autonomous technologies are being deployed across the entire spectrum of conflict and are being deployed as effective force multipliers to enhance the country's military capability across the entire multi-dimensional spectrum of conflict from outer space to the depths of the oceans. With future warfare being driven by technology, cross-domain

With future warfare being driven by technology, cross-domain capabilities will become increasingly integrated into ensuring that the limitless possibilities that will become available in the decision-making loop and the kinetic prosecution of conflict can be optimally deployed to achieve the aim.

capabilities will become increasingly integrated into ensuring that the limitless possibilities that will become available in the decision-making loop and the kinetic prosecution of conflict can be optimally deployed to achieve the aim; these will need to be optimally harnessed in scope and scale towards ensuring the maximum bang for the buck.

The changing nature of the maritime threat has highlighted the importance of effective Maritime Domain Awareness (MDA). The Indian Navy's multi-dimensional assets (satellites, maritime patrol aircraft, integral helicopters, surface ships, submarines and various information-sharing mechanisms including white shipping agreements with other regional countries) are deployed across the length and breadth of the Indo-Pacific. They are helping shape a conducive and favourable maritime environment as well as effectively pre-empting a developing situation that could have security and economic implications for the country. The country's coastal security organisation includes, amongst other things, a seamless radar coverage of not only India's entire coastline

but has been expanded to include some of our maritime neighbours as well.

Technology is changing the paradigm of naval warfare. The range and lethality of 'smart' weapons and sensors have increased manifold in an increasingly networked battlespace environment. The transmission of real-time information through a networked communication architecture including tactical and operational data links, strategic communications and multi-static sensors has greatly enhanced the situational awareness of commanders at sea and ashore and is enabling naval assets to be deployed more effectively at greater ranges, thus enabling a much wider coverage of the ocean and in support of joint operations. The days of ship-on-ship action at sea at limited ranges are no longer going to be the decisive factors in war, except to successfully achieve either sea control or sea denial and interdict the enemy's Sea Lines of Communication (SLOC), to prevent the movement of the enemy's trade and energy, thus degrading the enemy's economy and war waging capability. Most naval actions in the future will either be shaped by the desired end state on land or to achieve a maritime objective that will decisively tilt the balance in one's favour.

Conclusion

There is no doubt that in the foreseeable future, the outcomes shaping the world will be decided on land. However, as nations turn increasingly to the sea in this century to meet their existential requirements, the importance of the maritime domain will grow exponentially. Big power contestation, confrontation and conflict will take place on the oceans and will shape the future contours of the global order. The increasing frequency and intensity of the non-traditional and transnational maritime security challenges are going to impact populations on land and trigger external and internal tensions which will pose a threat to national security. Hence a joint and well-coordinated approach will be required to address

these with smart maritime power being the key to shaping a favourable outcome.

Notes

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Air Power and War Endurance in the Indian Context

Anil Khosla

"In the force, space, and time continuum, there would be a need for us to prepare for short and swift wars as well as be ready for a long-drawn standoff"

—Air Chief Marshal VR Chaudhari, COAS, IAF[1]

Abstract

The changing character of warfare and recent wars indicate a change in the trend related to the duration of wars. The conflicts are continuing for longer periods but with a wavering tempo of operations. The changing trend has reopened the debate about the aspect of readiness for a short and intense war or a long protracted one. The level of preparation required by the defence forces is determined by the combination of the expected duration of the war and the likely tempo/intensity of operations. Several key factors contribute to air war endurance and affect the duration, effectiveness, and efficiency of air campaigns. There is a need to review the factors associated with the use of air power vis-à-vis air war endurance. Air powers in prolonged

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conflicts must demonstrate resilience, adaptability, and effective resource management to endure the challenges associated with extended durations of war and contribute to achieving the desired strategic objectives over the long term. The Indian airpower, mainly IAF should be ready for short and intense war and be prepared for long-drawn standoff.

The trend seems to be changing now and some defence and strategic analysts feel that the days of short, swift, and limited wars are over. Further, the distinction between war and peace is getting blurred.

Introduction

The two World Wars were long-drawn affairs and lasted for five to seven years. These wars required massive effort and resources to sustain them causing a drain on the resources of the directly or indirectly involved countries. These wars were followed by a recession, reducing war-waging capabilities and reducing the efficacy of war to achieve political objectives. Wars since World War II have been local and with a limited number of participants for limited political objectives. Often conventional wars in the last seven decades have been short and swift. The few prolonged conflicts that took place were undertaken or supported by major powers who had adequate resources. The trend seems to be changing now and some defence and strategic analysts feel that the days of short, swift, and limited wars are over. Further, the distinction between war and peace is getting blurred.

The defence forces are directly involved in preparing for the conduct of war and have to be ready for all these situations. The higher direction of war stipulates the expected duration and intensity of a likely war. The changing trend has reopened the debate about the aspect of readiness for a short and intense war or a long protracted one. The military wherewithal is costly, especially the air assets for air war. Hence, there is a need to

review the aspects associated with the use of air power vis-à-vis air war endurance.

War Duration and Endurance

Wars can last anywhere from a few days to several decades. Long-drawn wars are characterised by their prolonged duration, continued engagement of military forces, and significant human, economic, and societal costs. Some examples of these wars include World War I (1914-1918), World War II (1939-1945), Korean War (1950-1953), Vietnam War (1955-1975), Iran Iraq War (1980-1988), and Afghanistan War (2001-2021).

It is essential to note that conflicts are complex, and the durations represent the broad spans of active hostilities. Additionally, some conflicts may continue in different forms even after the cessation of major combat operations. Efforts to end a long-drawn war often involve a combination of military, diplomatic, and humanitarian approaches. These may include peace negotiations, international mediation, sanctions, humanitarian aid, and efforts to address the root causes of the conflict. Reaching a sustainable resolution often requires addressing the underlying grievances and building a framework for long-term peace and stability.

Duration. Wars can be prolonged or of short duration as a result of various factors such as the character of the conflict, the parties involved, the goals and objectives of the war, external interventions, and the overall strategy and tactics employed by the warring parties. Some of the factors that can prolong a war are as follows:

- **Aim and Objectives.** Selection and maintenance of aim actually define the duration of the war. A clearly defined achievable aim leads to a short and swift war but an intertwined aim or changing aim defined without taking relevant capabilities into account invariably leads to prolonged conflict.

- **Complexity of the Conflict.** Wars with intricate causes, multiple stakeholders, and deeply entrenched issues are more likely to drag

on. The two World Wars would be under this category.

- **Geography and Terrain.** Wars fought in challenging geographic or climatic conditions can prolong conflict due to logistical difficulties and the strategic advantage it may provide to certain parties. Afghanistan is an ideal example of this aspect.

> **When external powers support opposing factions, it can escalate the conflict and make resolution more challenging, potentially leading to a prolonged war.**

- **Military Balance and Stalemates.** When opposing forces are relatively evenly matched, it can result in a stalemate, making it difficult for either side to achieve a decisive victory. History is replete with such examples.

- **Guerrilla Warfare and Insurgency.** Wars involving guerrilla warfare or insurgencies can be drawn out due to the asymmetrical nature of the conflict and the difficulty in defeating a dispersed, unconventional enemy. This aspect is becoming a norm with anti-national forces and organisations being supported by the enemy.

- **External Support and Intervention.** When external powers support opposing factions, it can escalate the conflict and make resolution more challenging, potentially leading to a prolonged war. The Ukraine conflict is a classic example of this factor.

- **Economic and Resource Factors.** The availability of resources, economic strength, and the ability to sustain a war financially can influence the length of a conflict.

- **Political Will and Negotiation Efforts.** The willingness of parties involved to engage in meaningful negotiations and find a peaceful resolution can significantly impact the duration of the war. A lack of political will or unsuccessful negotiation attempts can prolong the conflict. Once again, the Ukraine war fits into this category.

- **Ideological or Religious Motivations.** Wars driven by deep-seated ideological or religious beliefs may persist longer due to the fervour and commitment of the involved parties. Historically and even during recent times wars are being driven by religious ideologies and sentiments.

War Endurance. War endurance refers to the ability of a nation, military, or individuals to withstand and persist through the challenges, hardships, and demands of war over an extended period. War endurance is a critical factor in determining the outcome of conflicts. Historically, nations and entities with higher levels of endurance have often prevailed in prolonged conflicts, demonstrating the importance of preparation, resilience, and adaptability in times of war. War endurance is influenced by a complex interplay of various factors including physical and psychological endurance, resource availability and logistical endurance. A successful balance and effective management of these factors are crucial for a nation or entity to endure a war and sustain its efforts over an extended period. Some of the military factors that have a direct bearing on the war endurance are as follows:

- **Military Strength and Capability.** A well-equipped and well-trained military with adequate manpower and technological advancements significantly contributes to war endurance.
- **Logistical Efficiency.** Efficient supply lines and logistics are critical for maintaining the military's operations, ensuring a continuous flow of resources and support to the front lines.
- **Resilience and Determination.** The mental resilience, determination, and psychological preparedness of both the military and civilian population to face the hardships and horrors of war are fundamental for endurance.
- **Adaptability and Flexibility.** The ability to adapt to changing circumstances and strategies during a prolonged conflict is essential for maintaining a sustainable effort.

- **Alliance and Support.** The presence of strong alliances and international support can provide a morale boost, military assistance, and economic aid, enhancing a nation's ability to endure a war.
- **Geographic Terrain.** The geographical landscape can influence war endurance, as difficult terrain can make military operations more challenging and impact resource accessibility.
- **Technological Advancements.** Utilising advanced technologies in warfare can improve military efficiency, intelligence gathering, and strategic planning, potentially enhancing war endurance.

Russia-Ukraine War: Aspects Related to War Endurance

Russia-Ukraine war is well into the second year, with no end in sight. It began as a special military operation intended to be ended quickly but has become a prolonged war. The war has brought into light numerous points related to the duration of wars and war endurance.[2] These are commented upon below:

- Possibly, the Russian intention was to carry out a swift military operation and make a regime change in Ukraine. It did not succeed due to the interplay of several dynamics. The intention may be for short and swift conflict, but one can't really control it.
- One of the officially stated Russian objectives was the "demilitarisation of Ukraine". Russians attacked Ukrainian military bases and selective defence industry, considerably reducing the Ukrainian combat potential. The war-waging enablers need to be protected.
- After the high intensity of the operations initially, the tempo of the war has been wavering.
- While the use or non-use of full military power, especially air power, by Russia, raised questions for military thinkers and analysts. The answer could be that the calibrated approach to preserve military assets is

> **China's desire to dominate Asia and then be a global power obviously impacts India, as China sees India as an impediment to that desire. China would therefore like to fetter India's growth and keep it unbalanced through internal and external issues.**

essential in long-duration wars which Russia has subsequently prepared for.

• Ukraine does not have the capability to endure such a long war. Outside support from the USA and other European states, is enabling it to sustain the conflict.

• Harsh sanctions have been imposed on Russia. The sanctions do not deter aggression but their effect has to be catered for in the planning.

• No contact warfare philosophy is being used by both sides. Long-range vectors and drones are being used by Ukraine for retaliatory strikes and by Russians for punitive reasons. Even in the Armenia and Azerbaijan conflict drones played a decisive role.[3]

Indian Context

It is well known that India has two hostile nuclear weapon-armed neighbours with whom it has protracted disputes. China's desire to dominate Asia and then be a global power obviously impacts India, as China sees India as an impediment to that desire. China would therefore like to fetter India's growth and keep it unbalanced through internal and external issues. Pakistan continues to use non-state actors to maintain a situation of unrest for India through asymmetric means. China has strategic interests in using Pakistan. It is axiomatic that if the strategic interests of the two countries are aligned, they will maintain a strong and enduring strategic partnership that includes cooperation in the military sphere. As far as air warfare is concerned, there are numerous means for China and Pakistan to collaborate and synergise capabilities.

Aspects Related to Long-Drawn Air War

Air war endurance, also known as sustainability in aerial warfare, refers to the ability of an air force or a nation's air power to sustain prolonged operations and maintain a high level of combat effectiveness over an extended period. Endurance in air warfare is crucial, as conflicts may require sustained air operations over weeks, months, or even years. Effective endurance ensures that air power can maintain its combat capability, apply consistent pressure on the adversary, and achieve strategic objectives over the duration of the conflict. Waging a long-drawn air war involves a combination of strategic planning, resource management, technological capabilities, and logistics.

Operational Tempo and Intensity. Tempo is the rate at which military power is applied in an efficient manner across part or the entire area of operations. The level of preparation required by the defence forces is determined by the combination of the expected duration of the war and the likely tempo/intensity of operations. The versatility and flexibility of air power assets permit their high-tempo application. The ability to sustain a high operational tempo air war would entail, conducting numerous sorties and missions consistently over an extended period without a significant decrease in effectiveness. Several key factors contribute to air war endurance and affect the duration, effectiveness, and efficiency of air campaigns. Balancing these factors and optimising strategies to enhance air war endurance is critical for the success of any sustained air campaign.

Capability and Capacity Development

Capability vis-à-vis Capacity. Warfighting capabilities and the capacity to sustain operations are both essential. In other words, it is a combination of quality and quantity. While the capabilities of the Indian air power (e.g., reach, high altitude operations, precision, standoff, all-weather operations, airlift capability, etc.) have developed well, it is the

> **Well-maintained supply chains are crucial for operational readiness and the ability to sustain a protracted conflict.**

numerical strength of the air assets like fighter aircraft, combat enablers, AWACS, AAR, Drones, etc., needs to be increased.

Aircraft Type and Capability. The type of aircraft being used, their capabilities, payload capacity, and mission versatility significantly affect how effectively and efficiently air operations can be sustained. Therefore, quality and quantity have to be balanced. In the Indian context besides inducting the LCA to make up the numbers, an adequate amount of advanced fighter aircraft also need to be inducted.

Diverse Inventory. Indian military air assets have a very diverse inventory of platforms, systems, and weapons. Although, diverse inventory management is a logistic nightmare, but has the benefit of the availability of resources during part disruption of the supply chain or sanctions.

Logistics and Supply Chain Management. Efficient and reliable logistics networks and supply chains are crucial for providing fuel, ammunition, weapons, spare parts, other critical supplies, and resources to sustain aircraft operations. Well-maintained supply chains are crucial for operational readiness and the ability to sustain a protracted conflict. A three-pronged approach is required to ensure continued availability, i.e., use of domestic resources optimally, having alternate and multiple sources for procurement and building up storage capability.

Maintenance and Repair Capabilities. During long-duration wars, efficient maintenance operations are essential to ensure the continued availability of air assets for extended periods. A well-organised and effective maintenance and repair infrastructure is also necessary to quickly restore aircraft to operational status after damage or wear and tear. Overreliance on foreign OEMs is sub-optimal and a certain level of in-house capability is essential.

Fuel Availability and Consumption. The enemy's fuel supply chain is the first target in modern war because the machines of war cannot move without its replenishment. Efficient fuel management plays a crucial role in prolonged air operations. The consumption would depend upon the tempo of operations and should be calculated and planned accordingly.

> **Protection of air war endurance enablers from enemy attack becomes an absolute necessity. These vital points would require all-round protection, including protection from ground attacks by enemy Special Forces or terrorists.**

Storage capacity, dispersal of storage sites, and availability at operating bases are important factors for planning.

Training and Personnel Readiness. Intangible factors like morale, training and tactics are very important for military success and more so in long wars. Well-trained and skilled pilots, ground crews, and support personnel are critical for the effective execution of air operations. Skillful human resources can maximise the effectiveness of air operations, thus enhancing air war endurance. So far Indian air power has fared well in these aspects.

Protection of Air War Endurance Enablers. Between World Wars I and II strategic planners at Maxwell Air Force Base in Alabama, built on Billy Mitchell's ideas to devise a new and practical air power concept called "The Industrial Web Theory"[4]. This theory advocated using air power to attack deep inside the enemy's territory, the critical points related to the enemy's capacity to fight. Even in the recent Russia-Ukraine war, Russian air power targeted Ukrainian military targets to destroy its war-waging capacity. This aspect has pronounced relevance in long-drawn wars. Therefore, protection of air war endurance enablers from enemy attack becomes an absolute necessity. These vital points would require all-round protection, including protection from ground attacks by

enemy Special Forces or terrorists, attacks using sub-conventional aerial platforms, and aerial attacks by fighter aircraft and long-range vectors. Protective shelters (maybe underground) are essential and they should be able to withstand the destructive power of enemy weapons. Besides providing the appropriate AD umbrella of sensors and weapons, passive measures like dispersion, deception, camouflage, concealment, etc. are equally important.

Decision Making & Situational Awareness. In long-drawn wars, it is even more essential to make the right decisions. This decision-making is impacted by three factors which are, a high degree of situational awareness; a quick and robust network system for information sharing, and lastly decision support systems made more agile by AI. In today's wars, situational awareness is paramount to be ahead of the enemy's thinking. This requires multi-domain surveillance and reconnaissance capabilities. Manual data processing gets overwhelmed quickly because of the plethora of data-gathering sources. This makes use of AI-enabled systems for data processing imperative. Hardened survivable networks are essential for unhindered and quick dissemination of both raw and processed data. The IAF has progressed well in developing a networked environment.

Unmanned Platforms. There has been an exponential increase in the use of unmanned platforms and systems as has been demonstrated in recent wars in Nagorno-Karabakh, Ukraine and Gaza. This shift will only accelerate in the coming years as AI-driven capabilities of unmanned systems improve rapidly. Drones of various types are replacing conventional platforms with the ability to take on a range of missions across the complete spectrum of conflict. Investment in anti-drone systems is also the need of the hour.[5]

Employment Philosophy and Air Power Application

Clearly Defined Objectives. A clear and practical definition of objectives, at all levels i.e., political, military and air force levels are imperative. If

the objectives are clear it helps in the orchestration of the war and ensures there is no wasteful utilisation of air assets.

Integrated Conceptualisation and Planning. Warfare has become multi-domain in nature. For the best utilisation of resources, all capabilities are required to be used in concert

> In long wars, strategic plans need to allow for adjustments and adaptability in response to changing circumstances or unexpected events during a prolonged air war.

right from the tactical to strategic levels. Surface force and air strategies need to develop in an integrated manner. Joint operations are essential, especially between the army and air forces. Integration of operational plans is the most important aspect in a long war scenario. Limited air assets need full and optimal exploitation to further military operations for their final objective. The operational plans between the air and the surface forces have to be fully integrated. Both the pre-decided war plans and the dynamic in war planning need to be firmed up jointly. *The air war is essentially targeting and the* joint target list should be made together with a lot of thought and deliberation.

Strategic Planning, Adaptability and Flexibility. In long wars, strategic plans need to allow for adjustments and adaptability in response to changing circumstances or unexpected events during a prolonged air war. Thorough strategic planning, including intelligence gathering and analysis, is essential to identify targets, assess enemy capabilities, and plan effective air strikes. Accurate and up-to-date intelligence enables informed decision-making throughout the course of the air war. The ability to adapt to changing circumstances, tactics, and technologies is crucial during a long-drawn air war. Flexibility in strategy, tactics, and equipment usage allows for effective responses to evolving challenges. The strategy and tactics employed for the application of force need to be robust, aggressive and tailored to the prevailing situation. The two

premier institutions of the IAF i.e., Tactics and Combat Development Establishment (TACDE) and Aircraft and System Testing Establishment (ASTE) would have a crucial role, and solutions developed must find a way to all air power operators.

Grey Zone Operations/No War No Peace Situations. Operations which are not in the realm of war but can range from the normal jostling of statecraft to just short of a declared war can be called Grey Zone wars. These are increasingly resorted to by nations to circumvent the restrictions of international covenants and treaties. Both China and Pakistan resort to these operations regularly. The standard norm is to use air power offensively, however, there are many other ways in which it can be used in grey zone war for which some reorientation of mindset, planning and doctrine is required.

Air Power Application Strategy. Well-thought-out strategy would have to be employed for the application of air power. Relevant aspects would be as follows:

- Air war would have to entail effect-based operations. The resources available would have to be judiciously employed for maximum effect. The targeting would have to be selective to hit where it hurts the most.
- The principle of selective dominance would have to be applied rather than attempting to achieve air superiority.
- The risk-taking profile would have to be more conservative. Some assets like rotary and fixed-wing transport aircraft and drones are very vulnerable in hostile airspace.
- AWACS and AEW&C aircraft are essential in providing all-around situational awareness and for enabling integrated control over diverse air power resources.
- Unmanned platforms, drones, and swarms would have to be integrated into the overall air strategy.[6]

- Precision weapons and Stand-off capabilities are important for long wars to both strike surgically to avoid collateral damage, as well as to conserve own expensively trained manpower.
- Hand-held air defence systems can be a deterrent by imposing an uneconomical exchange ratio with respect of aerial assets especially in urban areas and hilly terrain.

However, it is important that while supporting self-reliance, the minimum level of deterrence capability needs to be maintained while retaining a balance between quantity and quality.

- The generation of a maximum number of sorties would be the most desirable aspect of air war. Various enablers for enhancing the sortie generation rate would include a high pilot-to-cockpit ratio, hot turnaround capability, automated equipment handling and availability of wherewithal for quick turnaround of aircraft.

Larger Vital Aspects

Indigenous Defence Industry. Self-reliance is an absolute necessity in long-drawn wars. Self-reliance in military equipment and defence production needs to be attained to include all facets that can be used in both offensive and defensive operations. The ability to ramp up defence production at the time of need should be addressed holistically with the availability of skilled manpower, machinery, raw materials, parts and sub-assemblies. The Indian Air Force has encouraged indigenisation by attempting to create a homegrown defence production capability. It has been operating indigenously built aircraft, and aircraft built in India under licence production, in order to give a boost to industries which are investing in the aerospace field. However, it is important that while supporting self-reliance, the minimum level of deterrence capability needs to be maintained while retaining a balance between quantity and quality.

> **Long wars necessitate effective management of available resources, budget, and personnel to sustain a prolonged air campaign without running into shortages or burnout.**

Infrastructure. Adequate infrastructure is essential to increase the war endurance. The adequate number of operating bases within proximity to the operational areas, and their ability to handle aircraft, refuelling, and maintenance, have a direct bearing on the air war endurance. Helipads in adequate numbers are essential, especially in hilly terrain. IAF initiative along with the Ministry of Road Transport & Highways, Government of India, of making stretches of highways as alternative runways is a step in the right direction. All the airfields should be dual use i.e., for use by both civil and military aviation. The Chinese model of Military Civil Fusion in this regard is worth studying. Besides, infrastructure for the storage of arms, ammunition, weapons and supplies along with transportation infrastructure is important. Protective infrastructure is also essential.

Resource Management and Sustainability. Air power is resource-intensive. With improvements in air power capability, brought about by innovations in cutting-edge technology, the cost of maintaining effective air forces has increased exponentially. Long wars necessitate effective management of available resources, budget, and personnel to sustain a prolonged air campaign without running into shortages or burnout.

Economic Sanctions. Economic and trade sanctions are a tool of statecraft, being used extensively against unfriendly nations extensively by the big powers. However, history has shown that the sanctions by themselves do not deter an adversary though they add to his difficulty. The effect of the sanctions especially on the air war, needs to be factored into the long-term plans since many imported critical modern air systems are in the realm of a few technologically advanced nations.

Collective Security. Collaboration and sharing resources with allied nations or coalition partners can extend the endurance of air operations by pooling together expertise, assets, and capabilities. So far India has never joined any military alliance. The relevance of collective security is not limited to military alliance anymore as it has relevance in dealing with grey zone situations using diplomatic support, intelligence sharing, cyber, and information warfare, etc. In the present circumstances, it is worthwhile to increase interoperability with friendly nations by carrying out exercises and developing commonality of equipment, procedures and tactics. IAF's initiative of graduating onto participation in multi-service and multi-lateral exercises both abroad and in India is progress in the right direction. Defence diplomacy has a big role and is an effective tool for political signalling and strategic coercion. The escalation matrix can be developed by a combination of the number and extent of defence activities.

Future Investments

Suggested future investments for the Indian Aerospace power to enhance its endurance for long wars are as follows:

- **Future Technology.** Air Force is a technology-intensive service. Development of technology into capability takes long periods of time, sometimes stretching to decades.[7] Therefore, there is a need to invest in emerging technologies and start brainstorming about their utilisation in warfare. Some of the future technologies that would impact air war and war endurance include Quantum computing, Hypersonic weapon systems, Artificial Intelligence, Robotics, Nanotechnology, Unmanned platforms, Drones and swarm technology, and Network-centric environment/Internet of things/system of systems.

- **Loyal Wing Man Concept.** Both manned and unmanned platforms have advantages and disadvantages. Therefore, they have to be used in unison in an integrated manner to gain the best advantage. Research

Some of the future technologies that would impact air war and war endurance include Quantum computing, Hypersonic weapon systems, Artificial Intelligence, Robotics, Nanotechnology, Unmanned platforms, Drones and swarm technology, and Network-centric environment/Internet of things/system of systems.

is going on in many countries on the "Loyal wingman" concept where an unmanned aircraft is the 'wingman' for a manned aircraft. In India, HAL is working on the Combat Air Team System (CATS) program akin to that concept.

• **Hypersonic Weapons.** Hypersonic weapons provide new opportunities for quick response and surgical long-range strike capabilities. This requires the development of new air defence strategies, as traditional air defence systems may be unable to detect or intercept these weapons. China is making rapid strides in this field. This would necessitate the development of new technologies by us, such as directed energy weapons or advanced sensors. Our fixed air assets on the ground would require enhanced protective infrastructure to shield them from such destructive and precise weapons.

• **New Domains of Warfare.** Domains like cyber, space, electronics and information have come into the sphere of warfare. China has set up the Strategic Support Force (SSF) as a separate service, with defensive and offensive capabilities in above mentioned four domains. We also required to reorient and reorganise to deal with these new domains.

• **Space-Based Capabilities.** Air power is increasingly referred to as aerospace power since the war has now expanded into the domain of Space. Space-based systems and applications are now used to enhance every aspect of aerial warfare. They provide capabilities such as navigation, targeting, communication, early warning of missile

launches and space-based surveillance. Not only in conventional war but even in grey zone war, the involvement of space-based equipment and systems is ever-increasing. The integration of these systems with air assets is expected to expand exponentially both for offensive and defensive operations. Suitable importance has been given to this aspect in the latest 2022 version of the IAF doctrine.[8]

Conclusion

Air power is a crucial component of war endurance, affecting the military, and psychological aspects of a conflict. Its ability to disrupt enemy operations can significantly influence the duration and outcome of a war. War endurance for an air force involves a combination of logistical support, personnel readiness, equipment maintenance, strategic planning, resilience, national support, international cooperation, economic strength, and diplomatic efforts to ensure sustained and effective military air operations over an extended period of time during a conflict. Air forces in prolonged conflicts must demonstrate resilience, adaptability, and effective resource management to endure the challenges associated with extended durations of war and contribute to achieving the desired strategic objectives over the long term. IAF should be ready for short and intense war and be prepared for long-drawn conflict.

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Recent Developments in Tibet and Xinjiang: Implications for India

Arun Kumar Sahni

Abstract

The current conflicts in Europe and the Middle East have led to an urgent review by nations globally, with respect to their military preparedness and security strategies. These conflicts have once again re-established the probability of conventional conflict, especially where there are festering issues of dissonance between neighbouring nation states. Therefore, the increased belligerence of an assertive China, manifesting in hegemonistic actions in its extended neighbourhood, is a matter of concern for India. It is necessary for India to be aware of the socio-economic and infrastructure changes in China's bordering autonomous regions of Xinjiang and Tibet, which have an impact on its war-waging capabilities. This article studies the transformational changes underway in these two bordering regions, that impinge directly on India's security.

Introduction

China's developmental activities on India's western frontiers are not a result of only the recent standoff in the Ladakh region, but a consequence

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of its long-term security and economic interests in South and Central Asia and internal security concerns in Xinjiang and Tibet Autonomous Region (TAR). The two regions account for approximately 30 per cent of China's land mass and border eleven different nation-states, making them vulnerable to events in China. To safeguard its security interests and insulate the population of Xinjiang, from instability and the negative influence of the ethnic diaspora in the Central Asian Republics (CAR), China is pursuing a robust economic policy and periodic military engagement, with these countries. Similarly, its endeavour to sinicize Tibet has an impact on the state of affairs in greater Tibet.

India needs to be aware of the pervasive socio-cultural-demographic changes and their impact on the demography of these neighbouring provinces. It also needs to be aware of the implications of the massive infrastructure development cum militarisation in these regions. It needs to evaluate the long-term effect of China's policies of subjugation in Xinjiang and on Tibetan religious practices, the succession of the Dalai Lama, the future role of the 'Tibetan government in exile' and other unforeseen challenges. This is essential to identify vulnerabilities and fissures that can be exploited subsequently as leverages.

Impact of China's Socio-Economic Policies—
Xinjiang & Tibet

China took control of its peripheral regions of Tibet, Xinjiang and Inner Mongolia, with a multitude of ethno-religious communities, to carve the territorial boundaries of the modern PRC. The initial policy was aimed at integration with developmental initiatives. But in the mid-1980s there was a shift from cultural accommodation to an overt policy of assertive assimilation. This change has increased the feeling of ethno-nationalism and a simmering disgruntlement against the State and has imparted an impetus to separatist movements. The cumulative impact of these socio-

economic policies on society and demography is looked at separately in these regions below.

Xinjiang. Xinjiang called the 'Pivot of Asia' by Owen Latimore, is China's strategic frontier and gateway to 'Eurasia and Europe. Apropos, it became China's hub for trans-Asian trade, with the provincial capital Urumqi, being the start point of the road-rail link to Europe. It is now a key element of Xi Jinping's flagship BRI project. The region is also important for China's energy security, as it provides an alternative route for transportation of oil and gas, through an extensive network of pipelines from the oil-rich regions of CAR. It is assessed to be mineral rich and the vast open terrain is being exploited for military training, space launch sites, silos for nuclear weapons and forward deployment of combat units towards the LAC with India.

Xinjiang, has a multitude of indigenous Turkic Muslim ethnic groups,[1] with Uyghurs in the majority and concentrated in southern Xinjiang. In contrast, the Hans are in majority in the urban centres of the North and East. There is a pronounced visible divide between the two due to differences in their language, culture and customs. The initial 'policy of appeasement' for integrating the region, was in deference to the legacy Soviet influence and impact of the November 1944, 'Revolution of the three Districts' of Xinjiang (Ili, Tarbagatai & Altai).[2] The breakdown of Sino-Soviet relations in 1962, led to China targeting the indigenous intelligentsia, relocating locals and promoting a policy of 'Hanisation' of the region. This precipitated an exodus of the indigenous Uyghur population, to the neighbouring regions of the then-Soviet Union, and sowed the seeds of separatist movements. The weakening of China's central authority, post the cultural revolution in 1966, led to the rise of Uyghur demands for independence and subsequently movements like the East Turkistan Islamic movement (ETIM),[3] in 1990s. The Urumqi riots of July 2009, impelled harsher policies of suppression by the State

The Urumqi riots of July 2009, impelled harsher policies of suppression by the State and relocation of rural Turkic Muslim ethnic groups into multi-ethnic urban centers, for effective population control.

and relocation of rural Turkic Muslim ethnic groups into multi-ethnic urban centers, for effective population control. China's 2nd generation of Minority Policy in 2010, instituted measures to address the mind space of the future generations of the indigenous population. To give these measures overt sanctity, it promulgated these under its Counter Terrorist Laws 2007, which were later updated in 2014 and 2015.

After President Xi Jinping came to power in November 2012, the policies became harsher. The 'Strike Hard campaign', launched in May 2014, led to imprisonment of about one million, Uyghurs and Kazakhs in detention camps for political education and ideological training. Learning Mandarin and other Chinese cultural practices were made compulsory. Population profiling through biometric data, voice samples and DNA was enforced. There were curbs on religious practices, and a new procedure was promulgated for undertaking 'Haj', in October 2020.[4] Doctored textbooks were issued to change the understanding of the history and reality of the region, with strict monitoring of the internet and social media platforms, to stop any online religious/ cultural discourse.

The appointment in 2016, of Mr Cheng Quanguo, architect of Tibetan suppression, as leader of the Communist Party in Xinjiang, led to the establishment of vocational education and training centres (internment camps) and the use of advanced surveillance technology for 'public monitoring'. 'Becoming Family' campaign was started in October 2016, for the Han cadres. It required compulsory homestay with local Xinjiang residents in the rural areas (five days in two months), to socialise with the Uyghurs and Kazakh families. They also started the 'Pair up

and Become Family' programme to promote inter-ethnic harmony and social stability.[5] In 2017, a concerted campaign started to subjugate the religious identity of the Uyghurs, resulting in damage to 65 per cent of the 16,000 mosques, with 50 per cent being destroyed/demolished.[6] It is apparent that the implementation of such regressive measures in Xinjiang, had the support of President Xi Jinping, for while addressing officials at a meeting on September 25-26, 2020, he conveyed his appreciation, by stating that the current policies are totally correct and successful. This progressive curtailment has undoubtedly reinforced Uyghur nationalism and incentivised separatist movements in the smaller ethnic communities of the region.

Tibet. Tibet/Xizang situated on the pristine Tibetan Plateau of East Asia, has a unique identity. It has had a fascinating history as an independent nation, with its own form of government, a functional administration, including an army. Its geographical location, physical environment and abundant natural resources endow it with immense geo-strategic significance. It is important to be aware of the territorial segmentation of Tibet to TAR, when we look at the militarisation of the region.

Tibet originally comprised of three traditional sub-regions of Kham in the east, Ü-Tsang in the west and central Tibet and Amdo in the north east. It was subsumed in the newly formed Peoples Republic of China, with a formal '17 Point Agreement', signed under duress by the young 14th Dalai Lama, in 1951. Post the annexation of Tibet, the eastern areas of Amdo and Kham were merged with the Chinese Provinces of Sichuan, Qinghai, Gansu, and Yunnan as 'ethnic autonomous prefectures'. In 1965 the remainder portion of western and central Tibet was reconfigured as 'Tibet Autonomous Region' (TAR) and replaced 'Tibet Area', established after annexation by the PRC (refer Map 1). The systematic reneging on the terms of the '17 Point Agreement' by the Chinese State led to widespread protests in 1959. The brutal response by China led to the

President Jiang Zemin launched the 'Developing West' campaign, under the 10th Five Year Plan (2000-2005). This strategic initiative was aimed to facilitate Tibet's integration, improve incomes and arrest migration.

Dalai Lama fleeing to India and the subsequent formation of the 'Tibetan Government in Exile', in Dharamshala.

The State softened its approach towards Tibet after the death of Mao Tse Tung and started a period of engagement from 1979 to 2002, for the Dalai Lama to return to China. Along with favourable socio-economic policies, President Jiang Zemin launched the 'Developing West' campaign, under the 10th Five Year Plan (2000-2005). This strategic initiative was aimed to facilitate Tibet's integration, improve incomes and arrest migration[7] and resulted in the construction of 35,000 km of roads, 4,000 km of railways, and dozens of new factories along with oil

Map 1: Administrative Redistribution of Tibet

Source: IO, CTA 1979 (Reproduced from Tibet 2000)

and gas pipelines.[8] In the run-up to 2009 Beijing Olympics, TAR like Xinjiang, witnessed a surge in local uprisings, including immolation by some monks. Resulting in harsher 'public control policies' in Xinjiang, with political re-education in Tibet. The Chinese 'White Paper' of 2015, legislated mandatory learning of the Chinese language and culture, for Tibetan youth, seeking jobs and financial incentives. 'Formative Chinese education', became a prerequisite, for youth seeking to pursue theological studies for monkhood. In prefectures like 'Ngati' with extreme anti-establishment sentiment, many were moved into 'Vocational Training Centers' or Reeducation Camps. Inter marriages between the 'Han' and the locals were promoted and the sinicization of Tibetan Buddhism commenced. It also foreclosed any conciliatory options with the Tibetan rebels outside the country and rejected the 'Middle Way' advocated by the Dalai Lama, till his public acknowledgement, of Tibet being an integral part of China.

Xi Jinping speaking at a conference on religions in 2016, stated that the government 'would guide religions practiced in China to be compatible with socialism.' At the meeting of the 7th Tibet Work Forum (the main policy organisation for Tibet), convened by the CCP in Beijing in August 2020, it was decided to restart re-education for Tibetan youth. China's White Paper of 2021 laid down the guidelines 'for governing Tibet in the new era', and espouses 'Xi Jinping's strategy on governing the frontiers and ensuring the stability of Tibet.' It emphasises the need to 'strengthen ethnic unity,' build a prosperous Tibet, protect the environment, take into account the international and domestic situation, and 'develop religions in a Chinese context.'[9]

Infrastructure Development

The PRC's perceived internal and external security threats in these far-flung bordering regions have always been the reason for the large military presence and construction of 'dual use' infrastructure facilities.

The developmental activities had a renewed focus, after the India- China standoff in eastern Ladakh, in 2020. Primacy continues to be to enhance road, rail, air and digital connectivity. China has set targets and objectives for the next five years under the 14th Five-Year Plan (2021-2025),[10] and laid down long-term objectives for 2035, that were passed by the National People's Congress in Mar 2021.[11] The plan highlights a number of key strategic initiatives and these are looked at in subsequent paragraphs.

Construction/Upgradation of Highways. China during this Plan period, proposes to enhance the existing road network within the two regions and strengthen the "strategic backbone corridors", between Xinjiang and Tibet. The priorities are the upgradation of NH G219, G318 Sichuan-Tibet Highway and extending G331 along India's border. These connectivity projects, while facilitating PLAs strategic mobility, will closely enmesh these regions and promote security. Focus on connectivity projects under Xi Jinping in these regions, has witnessed 51 per cent increase in the Highway systems, between 2015 and 2020.
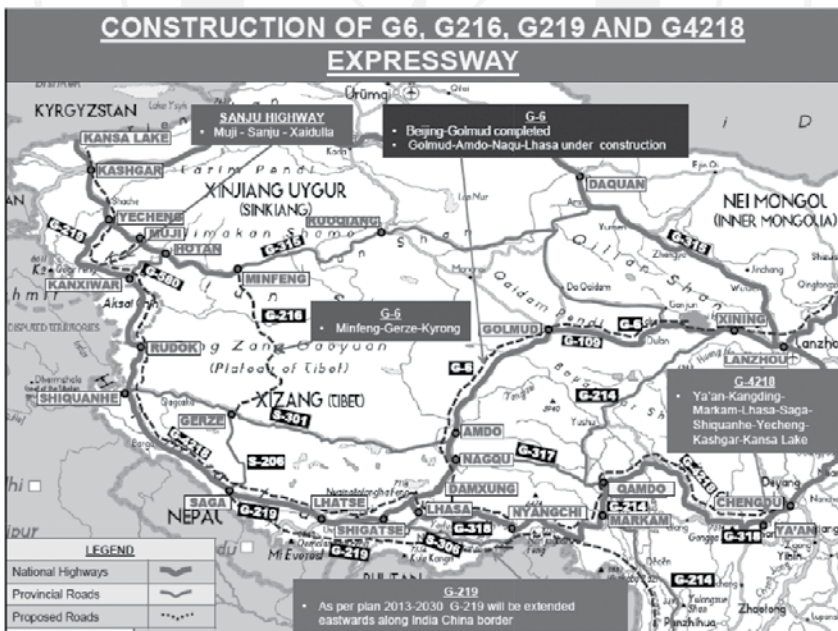
In XUAR, the focus is to connect major regional hubs to remote areas on China's borders. In western Xinjiang, China has constructed at least eight roads emanating from NH G219 towards the LAC, primarily for military expediency. Similar efforts of road connectivity are there in the eastern sector of TAR, opposite

There is also a proposal to construct 'five centres, three bases and one corridor' in Xinjiang, to enhance the state of its road, air, logistics, health and energy infrastructure.

Arunachal Pradesh, India. A new road and tunnel system was completed in 2021, connecting Nyingchi to Medog County, in close proximity to the LAC, shortening the travel time by eight hours and distance from 346 to 180 km. There is also a proposal to construct 'five centres, three bases and one corridor' in Xinjiang, to enhance the state of its road, air, logistics, health and energy infrastructure. The five centres are the regional hubs for transport, commerce, trade & logistics, financial

EXISTING ROAD INFRASTRUCTURE
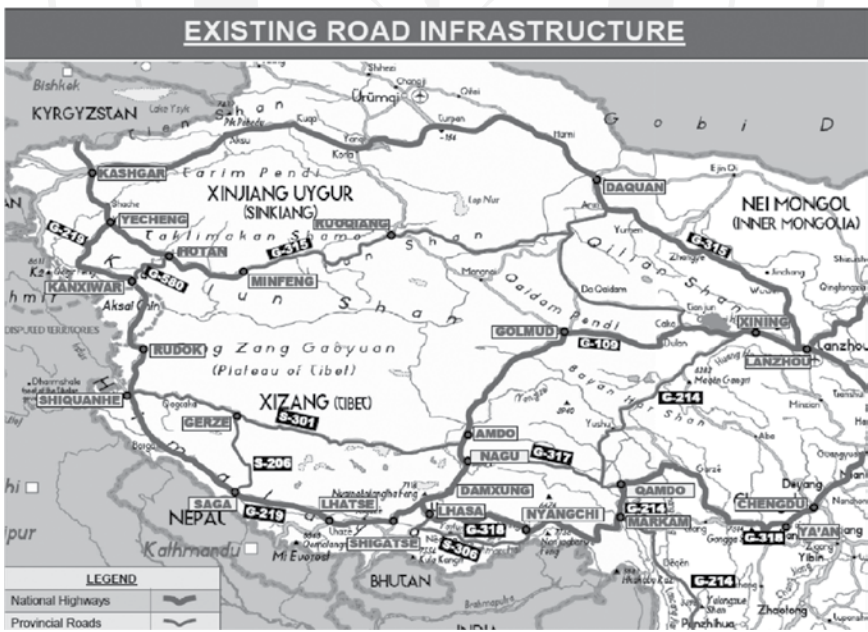
services, culture & education and health & medical. Three bases and one corridor are to exploit the energy and resource advantage of the region. Also, it is proposed to construct new expressways and upgrade the quality of existing road links, in TAR. Currently, 94 per cent of towns and 76 per cent of administrative villages are connected by black top roads. By the end of 2020, all first and second-tier border villages had access to roads oblique highways and by 2025, the total mileage of highways in Tibet will exceed 1,20,000 km and that of expressways exceed 1300 km. A second four-lane highway G9, between Chengdu and Lhasa, is a work in progress.[12]

Rail Connectivity. Along with improving its road network, China has embarked on a major effort to improve its rail network in the regions of Tibet and Xinjiang. The railways in Xinjiang have increased from 5,900 km of track in 2015 to 7,800 km in 2020. These links have connected many of the major military centres and airports which can be used both by the civil and the military. Whereas till 2020, TAR only had about 800 km of railways, due to the difficulty of construction in the mountainous terrain, it was only in 2006 that the first outward link from TAR was operationalised, the Qinghai-Lhasa rail link. This 1,432 km rail link, constructed on permafrost at 4,000 m, is an engineering landmark and has since been extended to Shigatse. On June 25, 2021, the second 435 km segment from Nyingchi to Lhasa, of the Sichuan—Tibet high elevated rail link (STR) between Chengdu (Sichuan) and Lhasa, was commissioned. It has a bridge-to-tunnel ratio of 75 per cent—47 tunnels and 120 bridges.[13] Its SE alignment has increased mobility capacities towards the LAC, opposite Arunachal Pradesh. The plan focuses on the completion of the last segment of STR, the Ya'an-Nyingci segment, by 2030. This will reduce the travel time between Chengdu and Lhasa to twelve hours from 36 hours. In the ongoing effort of sinicization of Tibet, the names of stations on this segment of the rail link are all in Chinese, instead of Tibetan.[14] The "medium to long term railway plan" released

by the TAR Development and Reform Commission, in early February 23, aims to expand the rail network to 4,000 km by 2025, including new routes that will run up to China's borders with India and Nepal. It proposes a Xinjiang-Tibet rail link along the existing road alignment of G219, through the disputed Aksai Chin region. It will start from Shigatse and run NW along the Nepal border, before cutting north through Aksai Chin to Hotan in Xinjiang. The planned route will pass through Rutog and around Pangong Lake on the Chinese side of the LAC. The first section, from Shigatse to Pakhuktso, will be completed by 2025 and the rest to Hotan, by 2035.
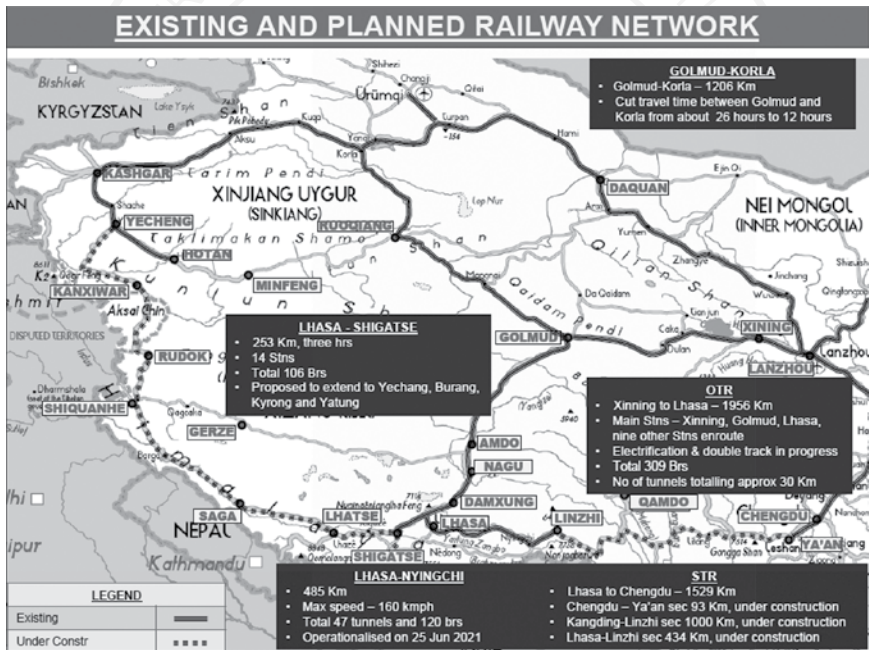
Air Infrastructure.[15] Based on OSINT China has 37 newly constructed or upgraded airports and heliports in these two regions, since the 2017 Doklam standoff. Twenty-two of the 37 are assessed to be military or dual-use facilities, enhancing PLAs' capability to speedily move/deploy combat resources. A large number of the recent projects

At least 15 airports have been upgraded since 2017, with seven of these being military or dual-use facilities.

have been to mitigate operational voids noticed in the Ladakh skirmish in 2020. In Tibet, the existing five dual-use airports, have been upgraded with new terminals, hangars, aprons, and runways. In addition, there are four new airports coming up across the vast regional expanse. The three airports at Lhuntse, Ngari-Burang and Shigatse-Tingri, are less than 60 km from the Indian borders and will give China multiple choices to project air power. Also, five new heliports and the upgradation of two, have given a fillip to helicopter-based operations in this rugged mountainous terrain. In addition, there are exclusive PLAA (PLA Army) operated heliports, extending from Rutog County in the west to Nyingchi city in the East. Similar developments are taking place in Xinjiang. At least 15 airports have been upgraded since 2017, with seven of these being military or

EXISTING & PLANNED AIRPORTS IN TIBET & NEIGHBOURING PROVINCESS

dual-use facilities. Airports like Hotan, in depth from the LAC, has now an additional runway, tarmac, hangars, and other ancillary facilities, including an Air Defence SAM complex in its proximity. Three new airports are under construction in proximity of its western borders with Pakistan and Afghanistan, of which the 'Tashkurgan Khunjerab'[16] airport, is a key element of CPEC and was operationalised in December 2022. In its proximity, to the north is a newly commissioned military heliport.

A notable change in the upgradation of airports is to ensure their resilience from air attacks. This was noticeable in the innovative construction of the 2nd runway, at an oblique angle from the end of the first runway, at Shigatse Airport. This now requires multiple precision strikes to make it inoperable. Also, adjoining the new airports are the terminals for roads and rail networks, with underground shelters and military air defence units, in proximity. This infrastructure at Shigatse Airport, 155 km from the LAC and close to the Doklam plateau, confirms its strategic significance. It can host fighter jets, helicopters (Z 15 Med utility helicopters) and UAVs (WZ-7 Xianglong/Soaring Dragon, HALE recce drone) for air and reconnaissance missions. Towards its west is the new rail terminal and large underground facility (UGF) for military assets. In addition, there is a second SAM base under construction to its North. Approximately, 490 km to its east, is the Nyingchi—Mainling airfield, 15 km from the LAC. This substantially increases China's ability to project military power, as Nyingchi is the permanent location of PLA's 52 & 53 Combined Light Infantry Brigades.[17]

Communication Infrastructure. The 14th Five Year Plan has accelerated large scale deployment of 5G networks[18] in Tibet/TAR, increased user penetration, upgraded the existing optical fibre and put in place the necessary spadework for deployment of future 6G technology. A 5G signal base has been set up at an altitude of 5,374 m, at Kangbalo, in 2020. The world's highest manually operated radar station.[19] In the case of XUAR, an advanced 5G network has been built in major urban

centres up to prefecture-level cities, by deploying more than 10,000 x 5G base stations, along with necessary infrastructure and facilities. Urumqi was one of China's first cities to be 5G enabled in October 2019. With an investment of US$ 261 million in 2021-22, the architectural framework for 5G high-speed communication and data connectivity, has been put in place. It now enables 5G communication capability to not only most towns and villages but also to spatially separated military units-formations-bases-weapon platforms, deployed at the LAC.

Hydropower Projects. China had approved eight dams in the upper and middle reaches of the Yarlung Tsangpo, out of which Zangmu dam was operationalised in 2014 and the remaining three dams—Dagu (640 MW), Jiacha (320 MW) and Jeixu, are at different stages of completion. The location of the remaining four in TAR is currently not confirmed, but likely to be in the lower reaches of the river, in proximity to the great bend, where the world's largest dam, has been recently completed in Medog County, bordering Arunachal Pradesh. These actions by an upper riparian state are of concern to India for its water security and weaponisation in times of conflict.

Well Off (Xiaokang) Border Villages. The Plan has approved the construction of 628 model Xiaokang border defence villages, in 21 border counties of TAR, from Ngari (Ali) district, across the Indian UT of Ladakh to Nyingchi (Linzhih), opposite eastern Arunachal Pradesh. Most of the 428 villages in the 1st tier have been completed and around 200 villages in the 2nd tier are under construction.[20] These villages will create physical footprints, in uninhabited/low-density areas, with loyalist inhabitants, as the 'eyes and ears' for the CCP, across extended frontiers and also interdict any infiltration from India of pro Dalai Lama Tibetans. The construction of these villages with all modern amenities/facilities of education, and health with financial largess are in stark contrast to what exists within India and indirectly attacks the mind space of the Indian local residents and troops, deployed in that region.

Specific Infrastructure for Armed Forces. Military-specific infrastructure has been a priority to improve China's combat operational profile against India and project power westwards. In Xinjiang, military bases, with billeting and supporting logistics, for two Infantry Divisions plus, within 6 to 12 hours of travel time from the LAC[21] has been constructed. In the adjoining Ngari prefecture of TAR, there is intense activity for military barracks and fortifications for long-range artillery.

> The construction of these villages with all modern amenities/facilities of education, and health with financial largess are in stark contrast to what exists within India and indirectly attacks the mind space of the Indian local residents and troops, deployed in that region.

PLAAF has upgraded existing facilities at 22 of the military/dual-use airfields in the two regions, with hardened shelters and extended/additional runways. These have been specifically observed at Hotan, Gar Gunsa, Kashghar, Hopping, Dkonka Dzong, Linzhi and Pangat airbases in the two regions.[22] Thus increasing the deployment of modern fighter and strategic bombers, duly protected with Air Defence assets of the PLA Air Force and Army. Two heliports with facilities for air maintenance have come up north of 'hot springs' and 155 km east of 'Pangong Tso Lake' opposite eastern Ladakh. Also, a network of helipads has been made in close proximity to the troop deployments on the LAC. In SE Xinjiang, operating facilities have been created for the operations of bomber assets like the JH-7A and H-6K platforms at a new air base 'Keriya', 170 km from Hotan air base.

The confluence of air, rail and road terminals has increased mobility and facilitated seamless handling of cargo and freight, including combat men and material. The integration of underground facilities at these multi-modal terminals has ensured the protected storage of

sensitive conventional/nuclear munitions and logistics. At places, these underground facilities are used for Command-and-Control centres by Western Theatre Command (WTC).

Logistic nodes for stocking ammunition and POL (petroleum, oil & lubricants), have been established at six locations in TAR—Linzhi, Ngari, Qiama, Rutog, Seni Nagqu and Yaophu. In XUAR the two nodes are at Urumqi and Kasghar with forward dumps at Moldo, Spanggur Tso, Tianshuihai and Demchok. Combined arms training bases and field firing ranges at Xiadullah, Kangxiwar, TWD, Chiakang and Shiquanhe have improved facilities for the firing of modern weapon systems and state of art monitoring equipment.[23] Another major connectivity project for the PLA is the road bridge across the narrowest portion of the 135 km Pangong Lake/Pangong Tso, operationalised in early 2023. The new bridge has significantly reduced travel time between PLA garrison at Khurnak Fort, to the south side, from 12 to 3 hours.[24]

It is important to note that although this analysis focuses on Tibet and Xinjiang, there are also developments underway in the other five regions, that have significant implications for China's military capabilities on its western frontier. Tibet and Xinjiang are just two of the seven regions comprising the PLA's WTC, which oversees combat operations and joint training of Chinese military forces throughout China's western expanse.[25] In Qinghai Province, for example, China has been making heavy investments in upgrading dual-use facilities in the city of Golmud, including the rail link Qinghai-Korla.

Implications

The implications can be addressed under three heads as given below:

Cumulative Impact of Population Control Policies. The suppressive and assimilative State policies, have been successful in establishing peace and apparent stability in China's bordering autonomous regions. But in a digitally connected world, the local indigenous population would be

aware of the contrasting lifestyle of freedom and dignity of their diaspora in CAR and elsewhere. This in addition to the suppressive policies of the State, will plant the seeds of dissent, which though dormant, are a vulnerability that can be exploited

> **Currently, Xi Jinping's centralised control has capped individual aspirations and dissent, like a dormant volcano, which when it erupts will be devastating.**

at an opportune time. The systematic human rights violation of the Uyghurs is another available leverage. In the case of Tibet, India's trump card remains the Dalai Lama and its capability to influence the Tibetan mind space, as Indian civilisational democratic culture cum democratic values, are in stark contrast to China's autocratic and restrictive nature of governance. Currently, Xi Jinping's centralised control has capped individual aspirations and dissent, like a dormant volcano, which when it erupts will be devastating.

The major cause for concern for India is the long-term impact of the current policies of forced 'reeducation', targeting the cognitive domain of an individual/the mind space, in the formative years of the Tibetans, Uyghurs and the other indigenous ethnic communities. The concerted effort to develop/influence religious practices in the Chinese context may achieve its long-term desire for the sinicization of these multi-ethnic populations. It is therefore imperative that India and like-minded countries, continue support to the 14th Dalai Lama and the Tibetan 'government in exile' in India. Thus, ensuring their influence on the Tibetan diaspora in China and retention of the existing leverage for India. Towards this end the recent 'Uyghur Human Rights Policy Act'[26] of June 2020, authorising the imposition of US sanctions against Chinese government officials responsible for the detention of Uyghur Muslims in special camps and the 'Tibetan Policy and Support Act of 2020' supporting the succession of Tibetan Buddhist leaders, including the Dalai Lama, as the final authority on his own reincarnation are

important. India on its part will have to continue support for the Dalai Lama and the Central Tibetan Administration and its 'Sikyong' (Prime Minister). This will ensure the continuity of Tibetan traditional cultural and religious practices and ensure empowered future generations.

Border Infrastructure. In addition to the deployment of additional resources closer to the border, the aspect of connectivity to and along the Sino-Indian Border, with its future projects and the role and impact of the newly established Xiaokang villages, has enhanced China's capabilities to manifest combat power fastest and as desired. China plans to boost border security by closely integrating border areas and augmenting its mobilisation capability, with new rail links towards the border in Tibet and also by linking it to other Provinces, by the end of the 14th Plan. Towards this, it is extending Tibet's existing railway link to an outside Province Qinghai, to three other neighbouring provinces of Sichuan, Yunnan and Gansu. In addition to the Xinjiang Lhasa rail link alongside the G 219, plans are there for new railway lines to Gyirong, the land port on the Nepal-Tibet border, and Yadong county in the Chumbi valley, which borders Sikkim and Bhutan.

The security implications of the 'Xiaokang' villages in intelligence gathering and becoming the 'eyes and ears' of the State as their footprint enlarges is a very strong likelihood. It facilitates one of the elements of the Chinese three-pronged strategy of establishing legal rights in claimed areas. It also has a psychological dimension, as the facilities and affluence of the infrastructure in these Chinese villages will be a stark contrast to those living in border villages in India and other Himalayan nations. It is playing with the minds of the population residing in close proximity to the LAC. This is also part of the 'three war strategy' of China, of which psychological ascendancy on the adversarial population is a key component. It is for the same reason, that it is renaming places in Arunachal Pradesh with Chinese names, to subsequently claim that these areas were always a part of China.

Another aspect that needs to be addressed is the issue of 'water security'. There is a growing probability of 'water wars' in the foreseeable future, as a result of global warming. The numerous large and small hydro projects on the Yarlung Tsangpo (R Brahmaputra)

Therefore, the weaponisation of water is another security imperative that may influence the final outcome of any future Sino-India border resolution.

and the source of all major rivers flowing into South Asia being from the Tibetan plateau, will in the long term have an impact on India's 'water security', as it is a lower riparian State to China. Therefore, the weaponisation of water is another security imperative that may influence the final outcome of any future Sino-India border resolution.

Military Capabilities and Capacities. The continuous upgradation and accretion in the road and rail network with dual-use facilities in proximity of the 4,000 km long LAC has enhanced the capability of PLA to not only conduct combat operations but to be able to project combat power from Western Theatre Command. The augmentation and modernisation of airfields and heliports in proximity of the external frontiers have made it possible for the employment of modern aerial assets for both ISR, mobility and offensive action in any future kinetic confrontation. The inter and intra movement of combat resources and military logistics within WTC has been very positively impacted. The speed and quantum of application of combat forces to the LAC, from the newly established military bases with supporting infrastructure, operationalised since 2020, especially in Xinjiang towards Ladakh, is a game changer. Corresponding activity in the other five regions of WTC and the rest of China with respect to military infrastructure has supplemented these operational changes. There is a need for India to factor in this time asymmetry in resource reallocation, in its military planning and fast-track suitable connectivity projects. The rapid deployment of extensive

mobile and data connectivity, including a 5G architectural framework, empowers the PLA to employ innovative and 'state of the art' weapon and surveillance platforms from 'swarm drones' to 'loiter munitions' etc. Also, it gives shape to its INEW (Integrated Network and Electronic Warfare) operational strategy, including hitting the adversary's cognitive domain.

Conclusion

India needs to have a comprehensive strategy to meet the imminent threat of a hegemonistic China. Firstly, it needs to have an encompassing developmental strategy that addresses the critical infrastructure and combat voids in the short term while increasing its deterrence. Secondly, it must develop leverages that can be operationalised when required and create task-specific partnerships to address existing asymmetry. For example, forging arrangements with the 'Five Eyes' grouping to acquire real-time intelligence. Thirdly, focus on strengthening its socio-economic conditions and technological threshold. The 'Atmanirbhar Bharat' strategy for making India self-reliant in critical areas and increasing its manufacturing base, to follow the mantra of manufacturing 'local for global' is the way ahead. Lastly, in the near term, the Armed Forces must adopt passive protection capabilities and adopt realistic counter measures against China's technological advantage in waging 'non-contact warfare'.

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Island Nation Adapting to Challenges from the Great Power Contestation

Thisara Samarasinghe

Abstract

An Island Nation can hold a unique strategic location in any ocean attracting the interest of major powers of the world. The challenges and influences of major powers or combinations of such powers could be circumstantial, and diversified in nature and proportions. This paper addresses this common reality, focusing on Sri Lanka in the Indian Ocean attracting major power influence and interest from Australia, China, India, Japan, and the USA. In addition, it covers the numerous techniques island nations might adopt to align to challenges not only from the great powers named above but also from other regions. It also discusses Sri Lanka's foreign policy, diplomatic ties, economic development, regional cooperation, and security.

Introduction

An island nation is a country or state generally surrounded by water on all sides, that does not share land borders with other countries.

Admiral **Thisara Samarasinghe**, RSP, VSV, USP, ndc, psc, DBA is former Commander of the Sri Lankan Navy with four decades of service in Sri Lanka with multiple experiences in the UK, India, China and USA. He has held diplomatic assignments in Australia, New Zealand and Pacific Islands. Presently, he is with a leading university handling maritime affairs and six other fields of graduate education. Views expressed are personal.

Easy access to water bodies and openness to major sea routes play important strategic roles as surveillance and warning posts, logistic bases for friendly navies, and strategic fortifications to prevent seaborne hostile intrusions against mainland targets. For example, Guam Island plays a key role as the strategic node in US defence in the Pacific, which is referred to as the "tip of the spear"—a place from which the United States can project military might. Sri Lanka (SL) is an island nation located in the Indian Ocean very close to giant India, and has concerns unique to itself, like power contention among great powers.[1] SL's geographical position has made it vulnerable to challenges arising from great powers. This contention has had significant implications for SL's foreign policy, diplomatic relations, economic development, regional cooperation, security and public perception. Therefore, an island nation like SL requires an unprecedented level of integration among the great powers and enhanced cooperation with other nations.

Since ancient times, the Indo-Pacific region has drawn considerable attention and has become a major geo-strategic point in the international system. In the 21st century, the region is playing a significant role and influencing international affairs. Admiral Alfred Mahan's statement demonstrates the present value of the region, "Whoever governs the Indian Ocean dominates Asia. This ocean is the gateway to the seven seas. The destiny of the globe will be determined by its waters in the twenty-first century".[2] The influence and interest of Western countries are also a major factor in the Indo-Pacific region.

SL is involved with numerous countries in this area and has established bilateral and multilateral collaborations that cover a variety of topics such as trade, security, socio-cultural, and infrastructure development. With these strategic initiatives and practices underway, SL stands to benefit greatly from its involvement in the Indo-Pacific region, focusing on a multi-layered regionalism approach as a chance to establish itself as a trade and maritime hub in the Indo-Pacific region. This paper primarily examines

how SL, as an island nation, is adapting to challenges arising from Great Power Contention in the Indo-Pacific region. It also explores the potential opportunities that SL can leverage by engaging with the major players actively involved in the Indo-Pacific region. As the great powers engage in various contestations, tensions in the global arena are escalating, and the

> **As the great powers engage in various contestations, tensions in the global arena are escalating, and the focus of the power struggle is gradually shifting from the West to the East.**

focus of the power struggle is gradually shifting from the West to the East. Therefore, this study aims to highlight how SL, as a small island nation, must address the impact of such challenges and adapt to new geopolitical trends emerging from the Indo-Pacific region's great power contestation.

Methodology

This part of the paper gives an overview to explain the methodology used for this study, and it gives the methods and techniques used to abstract the required data for the paper. It is planned to conduct a qualitative research method to obtain the solutions to the problem raised in this paper. Methods and techniques were based on knowledge gained from a literature survey. Empirical studies, questionnaires, use of statistics and data published by recognised institutions and scholars will be used for this study.

Qualitative methodology systematically organises the information in a planned way. The overall approach to addressing the problem will be from the observational foundation, and careful study of a preliminary literature survey for the collection and analysis of data. Primary and secondary data sources were also used for the data gathering including informal discussions on ground realities with those who have engaged with the

Balancing means teaming up with others to balance against a common threat. Meanwhile, Bandwagoning with the great powers increases a nation's security, regardless of ideology of power or type of government.

related duties of the diplomatic field. To this end, the research utilises secondary data from reputed scholarly journals, books, reputed web articles, theses, journal articles, conference proceedings, and previous studies.

Literature Review

The existence of a sovereign state in the world is dictated by relations with other nations.[3] In the international arena, the power shifted from a bipolar to a unipolar system after the end of the Cold War. The United States (US) influenced the world as a superpower in the international arena. With the emergence of the US as the unipolar superpower, many countries felt the need to balance US influence and power. In this way, some countries have evolved to become great powers in the world order, especially China which has become a challenge to the US today.

The US Indo-Pacific strategy focuses on advancing long-standing issues related to economic interests, security, and strengthened governance. Nations always seek to protect themselves from external consequences and act in their national interest. Thus, island nations must also shape their foreign policy strategies accordingly and wisely.

SL frequently relies on other nations and great powers due to its lack of capability to be economically or militarily strong. Food and energy security is a key factor in this regard. Every nation acts in its national interest. They do not make decisions without weighing the costs and benefits. This is identified as Bandwagoning or Balancing. Balancing means teaming up with others to balance against a common threat. Meanwhile, Bandwagoning with the great powers increases a nation's security, regardless of ideology of power or type of government.

Stephen Walt's balance of threat theory suggests that nations will mostly select to balance against threatening nations. Stronger nations tend to balance with weaker nations, while weaker nations tend to align with other weak nations but may bandwagon against stronger nations if they are threatened.

A key strategy for small island nations having limited resources and capabilities is Bandwagoning with great powers rather than balancing with them. SL's strategic position at the crossroads of major shipping lines also makes it important for the country to identify other important nations for support and to gain advantages in the Indo-Pacific region. As these nations lack military and economic capabilities, they seek alternate ways of engagement. As a result, small island nations have lobbied for collective security as a strategy and forged partnerships with great powers. For instance, SL has backed China's "One Belt-One Road" economic initiative. Realism dictates States should judge based on a cost-benefit analysis, and SL is comfortable that China could drive the country's economic progress.

The current scenario is assessed to be the result of a mix of fundamental flaws in the global order and power contention among great powers. Hence the importance of these powers engaging in constructive conversation is emphasised to avoid further crises and disputes. Accordingly, the importance of constructive and productive communication between SL and all relevant global powers is a priority. Over the past few years, the great powers in particular have used their economic resources to impose political influence. They use economic measures such as trade policy, Foreign Direct Investments (FDI), economic and financial sanctions, policies, and aid, to participate in geopolitics. Previously, governments attempted political and military colonisation to demonstrate their supremacy.

Due to great power contention, island nations are also impacted in terms of foreign policy, diplomatic relations, economic development, regional cooperation, and security. Island states in the Indo-Pacific

Even as the dynamics of great power contention continue to grow in the Indo-Pacific area, the region's island nations are keen to retain their independence, resist interference, practise defensive posture and defend their objectives and interests.

Region have diverse interests that are unconnected to the Quad's (the US, India, Japan and Australia) or China's aims. In terms of regional frameworks, China's rise came inside pre-existing frameworks such as ASEAN, which many nations desired to preserve. Members are concerned about the recent growth of great power rivalry beyond these frameworks. The Indo-Pacific idea has gained traction, owing mostly to increased challenges from great powers. As a result, regional dynamics, and collaborations, such as the Jakarta Concord within the Indian Ocean Rim Association (IORA), have been reassessed.

The Indo-Pacific region's power balance is altering, creating a more favourable atmosphere for island nation economic collaboration. Even as the dynamics of great power contention continue to grow in the Indo-Pacific area, the region's island nations are keen to retain their independence, resist interference, practise defensive posture and defend their objectives and interests.

Military alliances and direct hardware support to island nations large or small with land-based establishments for mutual security is a reality in the Pacific. Although there are no such developments in South Asia and Asia region during non-conflict periods, the presence of Nuclear States with maritime assets in the Indo-Pacific pose a legitimate concern to all in the region.

Challenges Faced by Island Nations

The efforts of great powers to build connections with countries that share similar values are raising alarm among island nations, who think

new competition would pose obstacles. Great Powers are now using their economic resources as a political instrument, employing a variety of economic measures such as trade, finance, FDI, sanctions, and aid programmes. These methods are employed to advance and protect national interests, allowing great powers to achieve their objectives.

China's Belt and Road Initiative (BRI) is a formidable undertaking that has resulted in considerable investment in infrastructure projects in nations such as SL. Given its key location on global transportation routes, the BRI poses both benefits and concerns for SL. Policy coordination, connectivity, financial integration, commerce, and people-to-people linkages are the project's five main goals. Through cultural and intellectual exchange and tourism, it has an impact on SL's macroeconomic policies, infrastructural development, trade flows and investment cooperation, financial sector activities, and social values.

However, some Western officials and scholars have criticised the BRI, labelling it "debt trap diplomacy" since China supports infrastructure improvements that leave nations with unsustainable debt and then utilises this financial and political influence to coerce those governments. For example, after the Sri Lankan government failed to repay its Chinese loan, the Hambantota port in SL is currently leased to China for 99 years. This port provides SL more control and benefits over the sea passage from the Gulf of Hormuz to the Strait of Malacca, allowing more merchant marine activities supporting the SL and Chinese economy.

Investment is an economic strategy used by great powers to achieve their geopolitical objectives. Great powers can provide financial support to SL in the form of FDI. Another aspect of economic connections is development aid. Following independence, the four Indo-Pacific area power holders gave development aid to SL to suit its diverse development needs. Loans, grants, and interest-free loans are the three primary types of development aid. Following that, China became SL's top bilateral development aid supplier. The Millennium Challenge Corporation

Geopolitical variables have grown increasingly crucial in influencing a country's internal and foreign policy in recent years, particularly for island nations like SL. The country is influenced differently by two great powers, India and China, which influence its internal and foreign affairs in diverse ways.

(MCC), which aspires to decrease poverty through economic growth, receives US development support. Because of its strategic position, SL has become a transit point for products to many nations.

Geopolitical variables have grown increasingly crucial in influencing a country's internal and foreign policy in recent years, particularly for island nations like SL. The country is influenced differently by two great powers, India and China, which influence its internal and foreign affairs in diverse ways. India has a considerable geopolitical interest in SL and is a big influence on its foreign and internal policies.

Indian influence may be found in a variety of domains, including the economic, political, and social. For example, India was instrumental in establishing the provincial council system in SL in spite of its small square area of land and the government pays substantially to keep these councils running. India's impact stems mostly from its economic and political goals. Through the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC), India has funded several development projects such as northern housing projects, rail and the real estate industry and some more are pending accomplishment.

China, on the other hand, is utilising economics to influence Sri Lankan affairs. Chinese economic participation in SL is prompt and may be seen in the Hambantota Port, Colombo International Financial City, and several road and infrastructure construction projects. These instances highlight the importance of economics in preserving regional dominance. During the terrorist conflict (1983-2009), SL had a close defence

connection with China, which included obtaining diplomatic backing, weaponry on credit, and military training, while the US was hesitant to participate with direct military hardware support owing to negative lobbying and other compulsions. However, under its FOIP strategy, the US has participated in increased bilateral security cooperation since 2015, after lasting peace was achieved in 2011.

In 2018, the Navy's hospital ship, the United States Navy Ship (USNS) Mercy, was deployed in SL in support of the Pacific Partnership (PP). The PP is an annual mission of forces aimed at enhancing bonds and enhancing emergency relief capabilities with regional partners.[4] The PP exercise involves humanitarian and civil aid. It demonstrates the distinct role of military public affairs. Public affairs professionals play a critical role in ensuring that such events and actions are discussed not only with a concerned domestic public but also with foreign nations.

This collaboration involves military equipment donations, maritime domain awareness, capacity building, and political discourse, primarily in the maritime sector. This tendency can be seen among other great powers like Australia and India, which are attempting to build security relations with vital Indian Ocean littoral states like SL. This scenario is being exacerbated by increased worldwide concern about non-traditional marine security threats such as Maritime Piracy, Maritime Terrorism, Drug Trafficking and Arms Smuggling, Environmental Security, Illegal Unreported and Unregulated (IUU) fishing and Climate Change.

In the geopolitical landscape, small governments confront several obstacles. "Balance or bandwagon" is one of these issues. Great powers utilise economic methods including assistance, credit lines, and FDI to keep minor states at bay. Hence SL is particularly vulnerable. The US has an interest in the South Asian area as well.

According to Ambassador Robert D. Blackwill, China claimed practically all of the oil and gas-rich South China Sea and rejected opposing claims from Taiwan, Brunei, Vietnam, the Philippines, and Malaysia.

Instead of military intervention, the strength of America's Asian allies and India's economies will be a critical factor in their ability to resist China's economic and financial instruments and maintain balance among Asia's current powers.

Japan and China also have a territorial dispute over islands in the East China Sea. In each of these examples, Beijing attempts to influence the policy of these governments using economic mechanisms, most notably access to the Chinese market. Instead of military intervention, the strength of America's Asian allies and India's economies will be a critical factor in their ability to resist China's economic and financial instruments and maintain balance among Asia's current powers while attempting to shape China's future external behaviour. SL must balance its ties with China, India, and other great powers with an interest in the Indian Ocean while it participates in the BRI and MCC. Due to many aspects of external and internal pressures and threats, balancing relations with all powers is a serious task. SL, on the other hand, will gain if they play the game wisely, and smartly.

So far SL has benefited from its non-aligned foreign policy, economically, politically, and militarily. SL is a founding member of the non-aligned movement and has voiced to declare the Indian Ocean as a nuclear-free zone. SL works together with all major powers, including those having different political ideologies, and their own interests in the Indian Ocean which are mostly conflicting and sometimes complementary. SL is trying to obtain the benefit from all major powers having a vested interest in the region without antagonizing any of them. If SL deviates from the non-aligned foreign policy, it will find itself in a Pandora's Box. In geopolitics, it is difficult to please everyone and satisfy them all.

SL with no interests and ability for military aggression, but practising defensive nonaligned posture is considered the best meeting platform

for all regional and global military and economic powers interested in the Indian Ocean to engage in meaningful dialogue and exchange of conflicting views for conflict resolution without aggression. In 2010 Naval and Maritime Galle Dialogue that was inaugurated, and the SL Navy's 60th Anniversary celebrations and US' engagement at the same table for three days in Sri Lanka were a clear example to the Naval leaders of the world, including Naval Chiefs of India, Pakistan, Australia, UAE, and Bangladesh and Admirals from Thailand, Indonesia, Russia, China, UK, France, Canada, South Africa.

SL understands there is an undeniable influence of India. However, SL being mindful and sensitive to this fact maintained good relations with China and the United States at the same time without SL making a hot spot for them. SL does not have a choice to be away from this influence given its strategic location in the Indian Ocean.

SL still acts just like a beautiful young lady who attracts men but does not give her consent to marry anyone and keeps on getting gifts. It seems to be a dangerous game to play but as long as the country does not lean towards any, it could survive and flourish. SL needs to understand the real interest and sensitivities of the major powers on SL. SL has a reasonably good relationship with all major powers economically, politically and militarily. India, China Australia and the USA are the largest providers of military equipment and training facilities for SL. All the above countries have provided the SL Navy with ships as grants or on credit.

Balancing and maintaining a good relationship with all would be more beneficial than bandwagoning as geopolitics and interests of major powers would change as happened in the recent past. One thing SL understands is that SL cannot be away from the Indian sphere of Influence. However, diplomacy has mitigated the influence so far for her benefit out of the strategic competition of the major powers. Sri Lankan authorities have explicitly expressed that SL will not let any nation use it in such a way that it causes any threat to the Indian national security, nor to any other.

The Sri Lankan situation in the present world geopolitical stand could be described as Strategic Convergence, Strategic Competition and Strategic Dilemma.

The Sri Lankan situation in the present world geopolitical stand could be described as Strategic Convergence, Strategic Competition and Strategic Dilemma. Strategic Convergence means all major powers have an increasing interest in SL in their own Indian Ocean Strategies. Strategic Competition means all these major players try to lure the country for their own strategies. Therefore, they naturally work well with the Sri Lankan government in the areas of economy, politics and the military. The Strategic Dilemma means SL cannot give more attention to anyone without being affected by its own national security. One of the reasons for the successful military victory over the LTTE terrorists to usher in an honourable peace after 30 years of conflict was the Sri Lankan non-aligned foreign policy and strong political leadership focusing against terrorists. Friend to all and enemy to none, SL got the moral, military, intelligence and material support from the world powers to eradicate terrorism from the country thanks to its stance of neutrality.

SL has leased the port of Hambantota to China and at the same time, it has also let India have their business in the port of Colombo. SL slipped to a serious economic crisis in the year 2022. It was India which first came to assist the country to come out from the brink of economic collapse. At the same time, SL needs the support of China for the debt restructuring. Therefore, SL has to work closely with China as it holds its largest external debt. The blue economy is SL's main focus to get the benefit from sustainable use of ocean resources. SL faces numerous non-traditional threats emanating from the sea. At the same time, it could enjoy enormous economic benefits of a blue economy to the distant future mainly by claiming water column and seabed resources, beyond the exclusive economic zone.

Adaptation Strategies

Recent diplomatic, political, security and economic events have important policy implications. Policymakers in many fields, such as political, economic, diplomatic, security and industrial policy, cannot function in isolation. They must collaborate and carefully craft their strategies by examining global trends regularly. Foreign policymakers must recognise that the development and implementation of foreign policy now involves a broader range and variety of players than in the past. This implies that policymakers must comprehend the political economics of support for and opposition to various development projects, that the government may accept or reject. It requires a cost-benefit analysis. Economic metrics alone are insufficient for evaluating development initiatives.

SL is already in a debt crisis, and to avoid sinking further into it, an economic diplomacy strategy that goes beyond political diplomacy is required. The country having natural resources both on land and in the vast ocean must aim to become an Indian Ocean tourist, commercial, and maritime hub. This necessitates significant infrastructure expansion and modernisation, as well as improved connectivity to regional markets and value chains. Financial assistance is available from BIMSTEC, BRI, and MCC. As a result, strategic units for studying and designing foreign and economic policies should be developed. Due to its strategic location in the Indian Ocean, SL maintains a policy of neutrality to handle pressure from great powers. Nonetheless, for commercial and cultural reasons, the government maintains friendly relations with all nations. Such engagements and developments of an island nation with political stability should be sustainable in the future, addressing the environmental sensitivities and challenges as well as rule-based ocean surveillance and governance.

Given the geographical proximity (distance) of an island nation to a major continental country, any physical connectivity between them would alter both external and internal dimensions and landscape and will be sensitive to those interested and engaging with the island country.

> **The political leadership of influencing powers and not so powerful smaller island nations must realise and be sensitive to the importance of the status of each other's population, their well-being, democratic framework, and their fundamental rights for existence.**

The political leadership of influencing powers and not so powerful smaller island nations must realise and be sensitive to the importance of the status of each other's population, their well-being, democratic framework, and their fundamental rights for existence. Any decision that would harm the survival of the population must be avoided and alternatives must be explored and pursued through dialogue with genuine commitment, always giving economic prosperity, non-aggression, and peaceful existence a chance.

Irrespective of the geo-strategic and geopolitical circumstances of any island nation, its location, natural resources, national security, human safety, and the economic well-being of its population determine how such a nation adapts not only to external challenges but also to the internal demands and indigenous social fabric as well as public and domestic perception.

Conclusion

Given its strategic location in the Indo-Pacific region, SL has become a priority focus for several great powers. China and India, as close neighbours, have a considerable effect on SL's domestic affairs, although the country also maintains connections with the US and Japan. Finally, being a small island nation, SL cannot live on its own and must adopt an acceptable method. It has the option of following the bandwagon or balancing itself with great powers as well as neighbouring countries.

However, due to the fact that small nations constantly depend on larger powerful nations, their security frequently faces uncertainties.

This decision must be based on a cost-benefit analysis and sovereign independent identity. Given the increasing competition in the Indian Ocean and the looming uncertainty, SL should remain non-aligned. SL's greatest strategy is to adapt itself to great powers that have welcomed SL as a friend with no compulsions attached.

The Indo-Pacific area, like the global economy, politics, and military alliances, may no longer follow the same curve as before. The region's future is riddled with problems that will need a far better grasp of strategic concerns and economic interests. Nations are attempting to transition from globalisation to regionalisation. Protectionism has been on the rise throughout the world in recent years. Although these tactics may provide short-term advantages, they have the potential to decrease economic development and raise poverty, and political and social turmoil, particularly in small island nations like SL.

SL needs to maintain its non-aligned foreign policy in order to face the Strategic Convergence, Strategic Competition and Strategic Dilemma in the Indian Ocean placing SL at the centre. Great powers should be gracious and honest in their approach to uplift the living standard of such island nations and win the hearts and minds, gratitude, and friendly stance of the population. It would be a valuable insurance for peace in the region.

Notes

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Rising Role of OSINT in Conflict/War

Sanjay P Vishwasrao

"OSINT provided roughly 90 per cent of the information used by intelligence community."[1]

—Lt Gen Samuel V Wilson, ex-Director US DIA

Abstract

Information and communication technology, the internet of things, and cellular networks have colluded with smartphones in the hands of globalised humans to change the character of war. Consequently, Open-Source Intelligence (OSINT) has emerged as the key driver of the intelligence acquisition cycle, with citizens and corporates involved alongside the militaries. Ongoing wars in Ukraine and Israel have exposed the link of social media with intelligence, strategic communication and cyber warfare. This new form of OSINT with a high level of civil-military synergy is making major contributions in all periods of conflict, stages of war, and spectrums of war. In order to secure India's interests, while it leaps forward to a US$ 10 trillion economy India needs to structure and strategise to win every technology drive competition in peace and war. Exploiting and defending against OSINT has thus become a key security necessity of our times.

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OSINT Revolution

Open-Source Intelligence (OSINT) a.k.a 'White Intelligence' has captured the eyeballs of political leaders, generals, soldiers, netizens and citizens because of the ongoing world's 1st Digital War in Ukraine. It is also being called the 1st social media war, like the Spanish American War of 1898 was called the 1st media war, the Vietnam War the 1st televised war and Arab Spring the 1st internet war.[2]

The proliferation of smartphones with up to 30 sensors in each, globalisation induced rising human interest in geo-strategy and homeland security, and human addiction to social media applications has triggered an OSINT Revolution.

This (re)awakening to the relevance of OSINT was bound to happen. Ushering of 2nd Generation OSINT (1st Generation was from 1940 to 2008) has happened due to the paradigms of information communication technology (ICT), internet-of-things (IoT), cellular telephony and smartphones with an ever-growing number of applications.[3] The proliferation of smartphones with up to 30 sensors in each, globalisation induced rising human interest in geo-strategy and homeland security, and human addiction to social media applications has triggered an OSINT Revolution. Every citizen with a smartphone is not only a soldier but is also a sensor.[4] The battlefields of the 21st century are full of eyes and ears, be it soldiers themselves using social media or ordinary citizens with smartphones. Social media today is at the cutting edge of the intelligence cycle i.e., detect/find targets i.e., open-source information data (OSD) and open-source information (OSINFO) for subsequent analysis and engagement. Crowdsourcing of OSINT provides intelligence operatives the opportunity to monitor events, collect information and assess the enemy's preparedness in real-time for battlefield transparency (BFT).

The flip side is that, planned 'event barraging'[5] (deception) can lead to wrong OSINT pieces being fitted into the jigsaw puzzle. The October

7, 2023 Hamas attack on Israel is a perfect example of this OSINT Trojan Horse a.k.a Black Intelligence. The collusion between state, military, intelligence agencies, citizen social media users, and commercial ICT and IoT companies is a wake-up call for practitioners of national security. A balanced evaluation of OSINT would list its advantages as low cost, high speed, good quality, variety of sources, low risk to the life of agents, automation of analysis and ease of sharing across borders. The drawbacks are a huge quantity of information and weaponisation for deception/ disinformation and for subversion/corruption of the intelligence cycle (Plan-Acquire-Process-Analyse-Disseminate loop) and the command cycle (Observe-Orient-Decide-Act loop). The 'whole-of-nation' (Israel) or 'whole-of-religion' (Hamas) or 'whole-of-alliance' (NATO vs Russia) approach to conflicts and wars is leading to global marshalling and weaponisation of OSINT sources. A large percentage of OSINT actors on both sides of the conflict may not reside in the battle space/war zone. Thus, rendering them ineffective is impossible within the limits of international laws.

In spite of the double-edged nature of OSINT, unclassified information is now seen as much more than supplementing classified information i.e., human intelligence (HUMINT) and technical intelligence (TECHINT). Triangulation for corroboration within and among OSINT, HUMINT and TECHINT is the new rule of the game.[6] So, while OSINT may appear to have reduced the fog of war, it has definitely increased the friction in war.

Ocean of OSINT

As per General Anthony Zinni (former commander of US Central Command), "80 per cent of what I needed to know as CINCCENT, I got from open sources rather than classified reporting. And within the remaining 20 per cent if I knew what to look for, I found another 16 per cent. At the end of it all, classified intelligence provided me, at best, with 4

per cent of my command knowledge."[7] Open sources are comparatively richer in data in today's flat interconnected globalised world. OSINT sources/ techniques are broadly classified as offline and online. Offline ones are diplomatic, academic, corporate and mass media. Online sources are social media mining, website analysis, geo-location, image analysis, network analysis, e-mail analysis and dark web

The success of OSINT depends on the use of disparate sources of open-source data (OSD), investigation of the dark web, and use of appropriate software, artificial intelligence (AI) and machine learning (ML).

analysis. OSINT process flow to exploit these online and offline sources is: to identify the source, harvest data, process data, analyse information, and report and disseminate assessments. The success of OSINT depends on the use of disparate sources of open-source data (OSD), investigation of the dark web, and use of appropriate software, artificial intelligence (AI) and machine learning (ML). In addition, due to the short life span of OSINT, the intelligence cycle has to be continuous and repetitive.[8]

OSINT is overt HUMINT as it is the people who create OSD and who possess OSD. Moreover, acquiring OSD and collating it into OSINFO for OSINT requires human effort. Due to ICT and IoT, OSINT can today give almost a 360-degree view of personalities, events, etc and so, is uniquely self-sufficient. Private commercial OSINT suppliers like BellingCat and Starlink, websites like https://liveuamap.com/, hobby OSINT providers like X (Twitter) handle of @OSINT_Insider and Telegram broadcasters like @DeepStateUA are blurring the lines of civilian efforts in war-fighting. This enhanced real-time public monitoring (सब कुछ सबको दिखता है) has imposed limitations on force manoeuvrability at strategic and operational levels. The so-called Wagner Group revolt against Russia in June 2023 is a case study of how a strategic manoeuvre to redeploy was supported by an elaborate Information Warfare (IW) plan of Prigozhin's coup against

President Putin. Thankfully, this BFT has also put caution into those wanting to conduct war crimes. It has also highlighted the criticality of faster OODA looping.

Military Lessons in OSINT

Internationally, the crowdsourcing exposes of Russian plans to invade Ukraine on February 24, 2019 using Google Maps, commercial satellite images, unencrypted telephone calls, Telegraph and Twitter has many lessons. The bombardment of pro-Russian Wagner Group's mercenaries in Popasna in August 2022 after the leak of a photograph of their location on a Telegram channel a few days earlier highlighted the outsourcing of detecting part of the kill chain.[9] This organised employment of citizens for OSINT by Ukraine is being called 'democratisation of the intelligence cycle'. The NATO IW attack on Russia over the alleged 'Bucha Massacre of 278 Ukrainians' in March 2022, exposed by OSINT and pursued by Human Rights Watch, has a different bag of lessons.[10] OSINT is definitely a double-edged sword.

India has witnessed both sides of this double-edged OSINT sword. Two important Indian OSINT successes: first, in 1984 Operation Meghdoot's pre-empting of Pakistani attempts to occupy Siachen Glacier based on OSINT of Pakistan buying special clothing from a foreign supplier.[11] Second, 2019 Indian decision to use the Indian Air Force for the surgical strike on February 26, 2019 (vis-à-vis use of the Indian Army for the Uri Surgical Strike of September 26, 2016). This may have been based on OSINT of Pakistani manoeuvres since December 2018 to force India to retaliate to the Pulwama Terror Attack with a land-based surgical strike. These manoeuvres were; the deployment of additional forces on the Line of Control (including Air Defence missiles),[12] the test fire of the LY 80 SAM missile on 11 January 2019[13] and nuclear missile tests from January 26 to 31, 2019 with IW message of "cold water over cold start strategy".[14] Pakistan's ultimate aim was to use this 'failure of

India's surgical strike' to influence the Indian General Elections 2024 using IW.[15] An interesting case of the same episode is that of Wing Commander Abhinandan's survival after his MiG-21 aircraft was shot down by Pakistan on February 27, 2019. He survived due to OSINT (or social media). And the behind-the-scenes story of his return by Pakistan, due to the Indian threats, admitted by Pakistani parliamentarians on October 29, 2020, became public knowledge 20 months later due to OSINT.[16] A possible example of Indian OSINT failure is Pakistan's Kargil Intrusions of November-December 1998 which remained hidden till May 3, 1999.

Thus today, OSINT is all pervading. It has roles in pre-war, war and post-war periods. It can provide: (1) situational awareness; (2) inputs on terrain, weather, technology and people; (3) threat/intent assessment; (4) inputs on targets; and (5) inputs on counter intelligence for automated intelligence preparation of the battlefield (IPB).[17] It is also necessary for projecting or exposing the lack of *jus ad bellum*, *jus in bello* and *jus post bellum*. OSINT serves the prosecution of war at the geo-strategic, strategic, operational and tactical levels. And, it is relevant in all types of conflicts/wars. It is the first step in the killing of a terrorist or an enemy soldier, and also in the killing of an opposing idea. The contribution of OSINT in the war effort will, however, vary with the level of penetration its drivers (ICT, IoT and smartphones) have in the objective area and among the target people.

Use of OSINT by India in War

About 2,300 years ago, Chanakya (or Kautilya) stressed on the use of intelligence in statecraft. Some quotes of his important advice are:[18]

- A king shall proceed to create spies: Spies under the guise of a fraudulent disciple, a recluse, a householder, a merchant, an ascetic practising austerity, a classmate or a colleague, a fire-brand, a poisoner, and a mendicant woman.

- Spies should be well-versed in inciting enemy forces to revolt, spreading false rumours about the enemy, mixing poison in the enemy's food supply, poisoning their drinking water, setting fire to the enemy's camp and bringing havoc and destruction, or if necessary, even assassinating the enemy leaders.
- If the end could be achieved by non-military methods, even by methods of intrigue, duplicity and fraud, I would not advocate an armed conflict.
- An arrow shot by an archer may or may not kill a single person; but skilful intrigue, devised by a wise man, may kill even those who are in the womb.
- The power of good counsel is superior to strength. Intelligence and science of politics are two eyes of the king to arrive at the best means and stratagem for a war.
- Conquest may be resisted at the slightest chance of a revolt within.
- Spies shall report on rumours circulating among people.
- The king shall protect his people from the intrigues of the enemy and win over/subvert people of the enemy country by gifts or sowing dissension.
- Power, place and time to launch a war are interdependent. If a king finds he is superior in all, he should proceed to crush the enemy.
- Clandestine agents shall wage psychological warfare against the enemy and weaken the enemy.
- Enemy shall be attacked when suffering from a calamity or when he is unprotected or when he is in unfavourable terrain.
- Chaos shall be created in the aggressor's camp and fort on the eve of an attack.
- The weak king shall arrange to kill the aggressor king.
- The enemy's army may be attacked in the rear and when it is staggering or has turned its back, attacked with the best of the forces.

- Soothsayers, readers of omens, astrologers, reciters of Puranas, intuitionists, and clandestine agents, those who helped the king perform the tricks and those who had witnessed them shall advertise them inside his territory. In the enemy's territory, they shall advertise, in particular.

> **If every social segment of the adversary's society using ICT, IoT and smartphones is penetrated, the quality of OSD inflow is likely to be high and good.**

When we apply the rules of the OSINT Revolution (ICT, IoT and social media on smartphones) to this advice today, the OSINT game will undergo an indigenous metamorphosis. This new Chanakyan Model of OSINT, can be better than the ongoing NATO-Russia War in Ukraine and the Muslim-Jew Conflict in Israel. The Chanakyan Model is explained in the subsequent paragraphs.

Cultivating spies in every segment of adversarial society could be difficult, costly and time-consuming. However, if every social segment of the adversary's society using ICT, IoT and smartphones is penetrated, the quality of OSD inflow is likely to be high and good. Infiltration of made-in-China smartphones, laptops, and 5G technology into other countries is an appropriate example. This will help generate strategic intelligence i.e., political, economic, social and infrastructure intelligence.

Spies should spread rumours, incite revolt and create havoc in the enemy camp so that peace is won with lesser use of resources. A plan to achieve this requires a high level of BFT on the target society and people, including their vulnerabilities and motivations. OSINT can help construct the foundation of this plan, while HUMINT and TECHINT can help strengthen the foundation and build the superstructure.[19] After the attack, OSINT would again be the frontrunner in post-strike damage assessment (PSDA).

Achieving ends by non-military methods across the spectrum of conflict in offensive mode means destroying the ideology of the adversary and his/their will to fight. In defensive mode, it means protecting own ideology and will to fight. The key intelligence question for commanders wanting to use this strategy is: what is the opposing ideology, how much strength does the target society derive from it and is willing to suffer to defend it, and its strength—weakness—opportunity—threat (SWOT) analysis. The majority of information on this can be collated from OSINT i.e., newspapers, publications by think tanks, social media platforms, books, television, etc. HUMINT and TECHINT can then be used to corroborate OSINT and to provide an update on the latest situation. The selection of non-military means (various tools of IW) will be based on inputs of reconnaissance pull (RECONPUL) by a combination of OSINT, HUMINT and TECHINT. Technique/source of intelligence for PSDA would vary; OSINT biased in urban areas and TECHINT biased in rural areas. At the strategic level, PSDA should rely on OSINT and TECHINT, while at the tactical level, HUMINT and TECHINT could provide better inputs. This applies equally to military means for an attack on a platoon post to a major theatre offensive.

Skilful intrigue to kill even those who are in the womb requires a plan which will lead to the collapse of the adversary's societal beliefs resulting in long-lasting peace. RECONPUL for an intriguing entry into the adversary's 'womb' (centre of gravity) would require OSINFO on various parts of the adversarial system, its strengths to be avoided, and its weaknesses to be exploited. OSINFO by multiple sources, once collated and analysed, can then be corroborated by HUMINT and TECHINT. PSDA would be best if based on TECHINT and HUMINT, as measuring psychological damage to the 'womb' using OSINT could be difficult. For a kinetic attack on a physical 'womb', OSINT and TECHINT would be better able to provide BFT.

Good intelligence assessment to help arrive at the best strategy requires an effective intelligence cycle covering OSINT, TECHINT and HUMINT. OSINT collated over a period of time should form the bedrock of the intelligence assessment. It would include weather, terrain, an organisation for battle (ORBAT), effectiveness of weapons, morale of society, war readiness, war stamina, etc. Important assessment points of OSINT must be corroborated by TECHINT and HUMINT. This will help generate campaign intelligence i.e., geographic, terrain, religious, logistics and alliance intelligence.

> **Identifying favourable power, place and time to defeat the enemy is the most important and difficult set of intelligence questions. The required database on ORBAT, equipment, terrain and weather, state of the economy, and state of the society can be best collected by OSINT.**

For conquest to be avoided due to the chance of a revolt within, the government has to secure its own population from subversion; especially in the launch pad of the offensive. This requires counter-espionage efforts whose foundation is OSINT.

To identify and neutralise the enemy's subversion of its own people and rumours being spread, the government has to rely more on HUMINT and TECHINT.

Identifying favourable power, place and time to defeat the enemy is the most important and difficult set of intelligence questions. The required database on ORBAT, equipment, terrain and weather, state of the economy, and state of the society can be best collected by OSINT. The final decision, however, may be based on corroboration by HUMINT and TECHINT. This will help generate tactical intelligence i.e., intelligence on weather, meteorology, obstacles, road networks and logistics systems.

Waging a psychological war to weaken the enemy requires drawing an IW strategy and plan(s) based on target audience analysis work (TAAW)

sheets. Most of the data required to fill TAAW sheets for each target audience comes from OSINT and TECHINT. For impact analysis (PSDA), however, IW staff will have to rely more on HUMINT and use social media as a link between intelligence, IW (strategic communication/psychological warfare) and cyber warfare.

Attacking the enemy when weak or unprotected requires an assessment of the enemy's ORBAT and equipment, terrain, weather, society, economy and impact of a calamity. The majority of the inputs can be acquired through OSINT but, the final decision should be based on HUMINT and TECHINT. Pakistan's present case is an apt example. OSINT hints at Pakistan today being internationally isolated and its economy failing due to elite capture of resources, severe damage by floods of 2022, etc. This has to be corroborated by HUMINT and TECHINT to arrive at a correct strategy.

Weakening the enemy before an attack by an adverse internal situation requires a separate plan. The broad inputs for this plan can be provided by OSINT, but specifics will require HUMINT and TECHINT. The best D-Day and H-Hour will however be provided by HUMINT.

Killing the aggressor's leaders will require a mix of HUMINT and TECHINT, depending on the choice of weapons.

Attacking the enemy from the rear and exploiting fleeting opportunities requires BFT on the enemy's ORBAT, equipment, strategy, tactics, morale, and the impact of its own operations. The initial intelligence collection would be OSINT-biased. Thereafter, after the battle is joined TECHINT and HUMINT would be better able to provide inputs on PSDA to stay ahead in the OODA loop competition. In the non-kinetic sphere i.e., IW, OSINT would be better placed to give good assessments.

The use of agents to subvert and advertise PSDA as part of IW to weaken the enemy's resolve and to deny people's support should form part of the overall IW campaign (grey zone warfare). If done well, it

can end the war early and in a favourable post-war treaty. TAAW sheets for this part of the IW campaign will also draw heavily from OSINT. Thereafter, for impact analysis (PSDA), reliance will shift to HUMINT and TECHINT.

Conclusion

Technological advances in a globalised world have increased the quantity and quality of OSD available. OSINT has become the tool of first resort for IPB. The notion and rules of secrecy, surprise and deception have also changed dramatically. The involvement of tech-savvy citizens in the war effort is a new paradigm. Simultaneous use of smartphones for OSINT RECONPUL attacks and IW is making the cyberspace over the battle space more complex. The side with OSINT as a force multiplier will be able to alter military force disadvantage by leveraging OSINT. To win, our adversary has to disallow the exploitation of citizen soldiers for OSINT/IW and we must be able to freely use our own citizen soldiers for OSINT/IW like a well-oiled machine. Pakistan's Inter-Services Public Relations and Inter-Services Intelligence achieved this very well during the Pulwama-Balakot-Abhinandan-F16 episode in 2019. Lesson; India may need regulation so that the government's war-time monopoly over OSINT is ensured.

Recommendations. Our armed forces have to learn to secure our economy and national interests. Key recommendations on OSINT for the future Indian Military are given below.

- Invest in creating technological leadership educated in repeatedly winning day-to-day competitions, unlike the once-in-a-decade large-scale confrontation of the 20th century.[20]
- Recognise OSINT as a double-edged force multiplier and issue strategy and standard operating procedures (SOP) to exploit it. We also need a strategy and SOP to defend against OSINT, including its use for IW by our adversaries.

- Create awareness among all ranks and train intelligence careerists in the use of OSINT. This should include exploiting OSINT and defending against its exploitation by adversaries, and language, ICT and IoT skills.
- Include defence wings of embassies/high commissions across the world as the first line of real-time OSINT.
- Establish alliances for sharing of OSINT, with a focus on indigenous and in-house capabilities.
- Establish 24×7×365 OSINT monitoring centres at all levels. These must include disinformation (fact check) laboratories and have the capability to manage big data using AI and ML.
- Establish OSINT teams at all levels, with embedded civil subject matter experts. These must have inter-departmental OSINT sharing structures and protocols at each level. 'Eight Tribes Model' suggested by Amiy Krishna in his Field Marshal Manekshaw Essay 2020-21 for CLAWS is a good way ahead.[21] 'Tribes' refers to various government departments generating OSD and needing OSINT e.g., Ministry of Defence, Ministry of Home Affairs, Unique Identification Authority of India, State Police, Intelligence Bureau, Research and Analysis Wing, Media, academia and think tanks, and corporate business houses.
- Establish networks to share OSD and OSINT in real-time using Made-in-India applications, secure cellular networks and clean smartphones.
- Establish good OSINT collation systems for permanent institutional memory and better speed and accuracy of the competitive intelligence cycles and OODA loops.
- Restrict the use of ICT and IoT appliances in the military, both in peace and in war.

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Massed Fires to Precision: Is the Balance Shifting?

PK Chakravorty

"I do not have to tell you who won the war. You know the Artillery did."

—General George S Patton[1]

Abstract

The need for precision was felt during the Vietnam War. This led to the development of a variety of Precision Guided Munitions (PGMs) which led to these being selectively used in the interregnum. The current war in Ukraine has seen an increasing quantum of Massed Fire as well as Precision Fire. In many phases, Russia has been firing 20,000 rounds per day while Ukraine is firing 4000 rounds. Artillery is the principal arm being used for operations. There is a need to see how our environment has been impacted. In our context, the Kargil operation in 1999 was the harbinger for the introduction of PGMs. Gradually we have introduced them and the high point was the usage of Spice 2000 bombs in the strike on Balakot in 2019. Precision weapons are costly and use of these on prioritised targets would be the answer.

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> **Precise engagements are possible by two methods. The first is to undertake a procedure of engagement known as precision shoot. This is by using conventional ammunition which is adjusted on to the target by a precision procedure which is time-consuming and cumbersome.**

Target Acquisition and Engagement

It is an indisputable fact that Firepower and Manoeuvre have been two components on which battles were won. Classical use of these was observed during the Gulf War in 1990. It is interesting to note that Western nations Fire to Manoeuvre whereas Russians Manoeuvre to Fire.[2] In our context, we are more flexible and adopt either method based on the situation.

Firepower essentially comes down to bringing effective fire on selected targets. The Cambridge Dictionary defines a target as "an object shot at during shooting practice, often a circle with a pattern of rings or any object or place at which bullets, bombs, etc., are aimed".[3] Armed Forces, be it any Service, aim at targets. They can be engaged by Direct Fire or Indirect Fire. To enable engaging by Direct Fire it is mandatory that the target must be visible to the sights of the gun to enable the cross wire to be laid on the target. Artillery Guns, Rockets, Missiles and Mortars are normally fired in an indirect mode. Tanks are normally fired in a direct firing mode. Fighter jets and helicopters as well as drones are used in a combination of direct and indirect firing modes.

Precise engagements are possible by two methods. The first is to undertake a procedure of engagement known as precision shoot. This is by using conventional ammunition which is adjusted on to the target by a precision procedure which is time-consuming and cumbersome. The other is to have PGMs. The United States Armed Forces, define a PGM as "a guided weapon intended to destroy a point target and minimise collateral damage".[4] This comprises artillery shells, missiles, rockets and

guided bombs. PGMs typically use the Global Positioning System (GPS), laser guidance or inertial navigation systems to improve a weapon's accuracy to less than 3 metres. The US sees the increasing use of Anti-Access/Area Denial (A2/AD) systems by China and Russia. As a result, they need PGMs to engage these targets.

The PGM concept started evolving from the Vietnam War onwards, progressed during the 1982 Lebanon conflict and was finally in the global eye during the Gulf War of 1990 where PGMs were used extensively against a variety of targets. Post the Gulf War, discussions revealed that the US was aiming for at least 30 per cent of PGMs in their inventory. The current military operations in Ukraine have further vindicated PGMs. However, it is more economical using conventional High Explosive (HE) Ammunition in comparison to PGMs. A look at US expenditure on the number of precision munitions for the past five years would highlight this aspect. The year 2019 witnessed a procurement of 65,800 munitions for US$ 4.6 billion, 2020 saw a reduced amount of US$ 4.8 billion, and 2021 had a further reduction to 39,600 munitions procured for US$ 4.3 billion. In 2022, US$ 3.8 billion were appropriated for 15,000 munitions and in 2023 the request was for 16,600 munitions for US$ 4.4 billion.[5]

Few varieties of PGM

It is important to consider a few varieties of PGMs with the US Armed Forces. These are as elucidated below:[6]

- **Air-Launched PGMs**
    - ¤ **Paveway Laser Guided Bomb**. This is a family of guidance kits that attach to unguided bombs. The assembly includes a seeker that fits on the nose of the bomb and a tail kit with fins to steer the bomb. When a laser is used to designate a target the seeker locks on to it and provides signals to the tail fins, enabling the bomb to be guided onto the target. These were developed during

the Vietnam War to enable tactical aircraft to deliver PGMs. The Paveway-III is the latest upgrade.

¤ **Joint Direct Attack Munition**. (JDAM). This is a tail kit that modifies unguided bombs. The tail kit is a GPS which provides accurate guidance. This was used in Kosovo by a B-2 Spirit bomber. JDAMs are used by all fixed-wing strike aircraft.

¤ **Hellfire Missile**. This is a Fire and Forget missile introduced into service in 1982 on the US Army's AH-64 Apache, using laser guidance to target tanks, bunkers, structures and leaders. They were used on the Unmanned Combat Aerial Vehicle (UCAV) Predator and later on the MQ-9 Reaper.

¤ **Joint Air-to-Ground Missile (JAGM).** This has been made as an advancement of the Hellfire Missile and would replace Hellfire, TOW and Maverick missiles. The missile has a new warhead and seeker which is paired with the existing AGM-114 R rocket motor to provide better target acquisition and comprehension. It started testing in 2010 and was declared to have initial operating capability (minimum acceptable capability), about four years ago. They can operate from the Apache and Super Cobra attack helicopters.

¤ **Joint Air to Surface Strike Munition (JASSM).** This is a 14 ft long, 2,250-pound missile that can operate on multiple aircraft. It is operational with B-1B Lancer, B-52 Stratofortress, F-16 Falcon, F-15 E Strike Eagle, F/A 18 Hornet and F-35 Lightning-II. An improved version was developed in 2004 with an improved IR seeker, a two-way data link and an enhanced anti-jam GPS receiver. The extended range version can cover from 926 km to 1,920 km.

¤ **Long Range Anti-Ship Missile (LRASM).** This has been used to replace the Harpoon missile. This is the AGM-158C Missile which has an operational range of 926 km. It can be operated

by stealth bombers as well as fighter jets operating from aircraft carriers.

- **Ground-Launched Precision Munitions**
  - ¤ **M 982 Excalibur.** This is an extended-range artillery shell with a calibre of 155 mm. It is developed and manufactured by Raytheon and BAE Systems. It is a GPS and inertial navigation-based system. It can be fired in a variety of weapon systems with 155 mm calibre guns. It has a stated accuracy of 2 metres[7] but the final result would depend on the accuracy obtained of the target location. Since in many cases a pinpoint location is difficult to obtain it would be pragmatic to presume that the CEP would be 5 metres. The shell is extremely expensive and each shell costs US$ 68,000 as compared to a conventional HE round costing US$ 800. It is widely used by many countries.
  - ¤ **Army Tactical Missile System (ATACMS).** The Missile is a 610 mm rocket that can be launched from M 270 MLRS or the M 142 High Mobility Artillery Rocket System (HIMARS). Developed in the 1980s, GPS guidance was added later. The latest version achieves ranges up to 300 km. They are currently based upon a combination of an Inertial Navigation system with GPS in the loop. The accuracy is good and varies as per open sources between 10-50-metre CEP.[8]
  - ¤ **Guided Multiple Rocket Launch System. (GMLRS).** A GPS-guided 227 mm rocket which is capable of being fired from M270 and HIMARS. These rockets achieve range from 15 to 70 km. The rocket has a Median Miss distance of 2.1 metres.[9]
  - ¤ **Precision Strike Missile (PrSM).** PrSM is a new development of a weapon with the intent to replace ATACMS. It would enable two missiles to be launched simultaneously in a launcher compared to one of ATACMS. It would have a range over

> **Loitering Munitions are designed to provide unprecedented levels of flexibility and precision in modern warfare. They are meant to attack targets directly, making them a game changer in modern warfare.**

400 km and have an anti-jam GPS antenna. The weapon is expected to be operationalised shortly.

¤ **Loitering Munitions.** Loitering Munitions are a new generation of Unmanned Aerial Vehicles that are designed to provide unprecedented levels of flexibility and precision in modern warfare. They are meant to attack targets directly, making them a game changer in modern warfare.[10]

- **Naval Precision Munitions**
    - ¤ **Tomahawk Cruise Missile.** Developed in 1970; currently, the Block IV variant is the latest. It has a range of about 2,500 km with a speed marginally less than the speed of sound. It uses an Inertial Navigation System and GPS and the CEP is 10 metres.[11] The missiles are extremely effective.
    - ¤ **RIM-174 Standard Extended Range Active Missile (ERAM).** This is also called the Standard Missile-6. Designed in 2004 it receives information from a Radar and Advance Early Warning Aircraft. The information is received in flight. The published range varies between 240 and 460 km. It has an Inertial Guidance System and the terminal guidance is active and semi-active radar homing. The latest version has GPS inserted. There is no open-source information on its accuracy.

Massed Fires vs Precision: The Ukraine War

As is evident, precision weapons being accurate are expensive. They are effective if the target data is accurate and there is a mode of undertaking Post Strike Damage Assessment (PSDA). Often in environments where target description is not accurate and to cover large areas, massed

fire using conventional ammunition is needed and proves to be extremely effective.

It would be interesting to study the Ukraine War which continues unabated, where Artillery has played a predominant role. Russia's weakness during the current war was the performance of

The point at issue is that precision, particularly long range, does provide advantages but Massed Fires help to sustain the effort in a long-drawn battle.

its ground forces. Their ability to undertake tasks was mediocre. This has been considerably offset by their leveraging of massed artillery fires to facilitate a slow and deliberate advance. Massed Fires applied in a sustained manner have resulted in displacing the local population and destroyed their residential shelters and infrastructure. This devastation has compelled the Ukrainian military to withdraw.[12] It was estimated in 2022 that Russia was firing 20,000 rounds per day and Ukraine probably 5,000 rounds per day.[13]

The War also provides some insight into the question regarding the appropriate balance between Massed and Precision Fires. Both countries have used large quantities of unguided projectiles and precision ammunition. Massed artillery has covered numerous weaknesses of the Russian Army. It is pertinent to note that precision ammunition was used extensively by the Russians. They are using a combination of air, ground and sea-launched long-range precision missiles for strategic purposes engaging targets in depth including civilian infrastructure. Ukraine has countered Russian artillery by using a mix of domestic and Western-origin artillery to bring on Massed Fires. It has also used long-range drones and the HIMARS system to strike deep into Russian territory targeting logistics centres. In addition, it has used US-manufactured precision guided artillery shells. The point at issue is that precision, particularly long range, does provide advantages but Massed Fires help to sustain the effort in a long-drawn battle.

It is pertinent to describe the Russian doctrine of combat. Firepower is most important for the Russian Forces. Artillery is Russia's primary arm. Firepower enables assaulting forces to position themselves in a manner so that artillery can deliver fire that destroys targets thereby paving the way for success. For static operations, Russians execute centralised control over their artillery thereby optimising its effects.[14]

Another cruise missile used during the operations is the Ukranian-designed Neptune missile which is an improvement of the Russian Kh 35 Cruise Missile. The Russian cruiser Moskava was sunk by two of these missiles on 13 April 2022. Further a land attack variant destroyed a S-400 missile system radar in Crimea on 23 August 2023. These were two precision attacks by the Ukrainians resulting in severe damage to Russian equipment.

It would be appropriate to state that Precision is gradually assuming greater importance, particularly where target locations are known or can be constantly monitored. The high cost makes its use prohibitive against targets whose data is not specific but appreciated, and where massed fire can decimate the target. It would be logical to discuss how this would impact our environment.

Applicability to our Armed Forces

The terms 'Massed Fire' and 'Precision' entered our lexicon during the Kargil Conflict in 1999. Firepower was a major component of the conflict. It was during this period that precision engagement became a must. Targets were on mountain tops like Tiger Hill and Tololing. The 155 mm Bofors Gun was used in a Direct Firing role in a procedure known as Direct In Direct Fire (DIDF). In this procedure, the cross wires of the Dial Sight were laid on the target, whereas the range was measured by a Laser Range Finder and converted to elevation for the charge to be fired from the Range Table. In most cases, the first round was a target round. Often adjustments for range had to be undertaken. It was during this period that the Krasnopol Russian PGM was imported. This is a Russian

laser-guided artillery shell and possibly 3,000 rounds were imported between 1999 and 2002.[15] The ammunition was successful in plains and low hills but in high altitudes was not giving the desired results.

Post the Kargil conflict, the three Services realised the importance of having greater quantities of precision ammunition in conjunction with conventional ammunition.

It is learnt that over 2.5 lakh rounds were fired by India during the conflict. There were about 300 Artillery pieces which were used. It is estimated that 5,000 rounds were fired on an average every day. It is interesting to note that 9,000 rounds were fired on the day Tiger Hill was captured. When compared to the relatively smaller area within which the Kargil War took place, this exceeded the rates of artillery fire during the Second World War. It is also important to note that on July 3, 1999, direct firing on Tiger Hill began and continued till the attacking troops of 18 Grenadiers, asked the guns to stop firing as they had reached the top. The fire was devastating and Tiger Hill was captured.[16]

The Indian Air Force also actively participated in the operations. The use of airpower commenced on May 26, 1999. The primary munition used was mainly 57 mm Rockets which were used by three variants of Russian fighters. Two fighter jets and one helicopter were lost by the Indian Air Force. They were casualties to shoulder-fired missiles. It was then that a need was felt for precision ammunition. ASTE Bangalore quickly modified Mirage fighter jets to carry US-made PGM Paveway II with the help of Israeli Litening pods. Seven modified Mirage 2000 were used on June 17 to decimate the enemy's administrative base at Muntho Dhalo. A week later on June 24, 1999, the Mirages struck the Northern Light Infantry's bunkers at Tiger Hill. The target was acquired at about 12 nautical miles, and the weapon was released at 5 nautical miles.[17]

Post the Kargil conflict, the three Services realised the importance of having greater quantities of precision ammunition in conjunction with

conventional ammunition. They followed the US pattern but numbers were extremely small due to exceedingly high cost. A few of these are elucidated:

- **BrahMos Supersonic Cruise Missile System.** An indigenous two-stage missile system with a range of more than 400 km. It has pinpoint accuracy with a very low CEP. The missile operates with the Army, Navy and the Air Force.[18] Accurate targeting data is extremely important for its optimum usage.

- **Drones.** The Indian Army was the first to receive a Searcher Mark 1 UAV. In a short time, the Air Force, followed by the Navy, caught up and graduated to the level of UCAV. Currently, we are manufacturing drones indigenously and also procuring 31 MQ-9 B Reaper Drones from the US which would cost US$ 3.5 billion. These will be used for multiple purposes including the firing of missiles. All Services are procuring swarm drones for engagement of targets with accuracy.

- **Naval Missile Systems.** The Indian Navy has undertaken the development of a number of missile systems which are capable of precision capabilities in surface-to-surface, surface-to-air and underwater-to-surface missiles. Barak Missile system is an eco-development project between DRDO and IAI System Israel.

- **Excalibur.** The Indian Army had procured the 155 mm Excalibur extended range guided rounds and test-fired them from M777 Ultra-Light Howitzer (ULH) in 2019. The initial batch of 1200 Excaliburs were procured in October 2019. This guided munition has a CEP of 5 meters and currently can be fired from M 777 ULH and K 9 Vajra.[19] This is a force multiplier with the Indian artillery.

- **SPICE-2000 Used by Air Force at Balakot in February 2019.** The Spice 2000 bombs that were used in Balakot air strike to avenge the Pulwama attack were made in Hyderabad at Kalyani Rafael Advanced System (KRAS) facility.[20] The Spice 2000 were dropped from Mirage 2000 and could glide for a distance of 60

Km before engaging the target with a CEP of 3 metres. The strikes were effective.

- **Loitering Munition.** This is being procured and would be used at all levels.

Efforts are being made by the three Services to enhance the precision content despite its prohibitive cost. In discussions, it has been stated that at least 10 per cent of our ammunition should be precision and the rest conventional. Thus, Massed Fire would continue to be our mainstay with Precision selectively used against prioritised targets.

On October 7, 2023, Hamas fired 5,000 rockets and intruded into Israel by land, sea and air causing heavy casualties. This was the use of Massed Fire and resulted in deaths and casualties on both sides. Hamas has also captured Israeli hostages who in the past also have been used as a bargaining shield.[21] Israel has declared war against Hamas and is currently using Massed Fire and Precision fire on selected targets. Ground offensive on the Gaza Strip is currently underway. Whatever be the case it would involve Massed Fire with selective Precision Fire.

Conclusion

In our context, we would gradually enhance our Precision Fire content while using Massed Fire as the main component till our Intelligence, Surveillance and Reconnaissance capabilities are state of the art and we can use Precision Fire without wastage of this exponentially expensive resource. An optimum mix would balance cost with success in operations.

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Securing India's Security Interests in a China-Taiwan Conflict

Kamlesh K Agnihotri

Abstract

The security situation across the Taiwan Strait is precariously poised, with China having adopted an overtly proactive stance over the past couple of years. The current hardline stance of China which considers this time as "a new starting point for reunification", creates further portends for conflict. In this context, this article provides a brief overview of the evolving India-Taiwan relations; assesses the contours of the China-Taiwan conflict; investigates the effect of such a contingency on India's interests in terms of quantum and intensity and finally analyses the options available to New Delhi to mitigate, if not wholly address the consequential challenges.

Introduction

The Nationalist Party (Kuomintang), having faced the brunt of the protracted civil war with the communists in mainland China in the 1940s, was forced to relocate to the island of Taiwan in 1949, along with around 1.2 million loyalists and followers. Taiwan's efforts to

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Notwithstanding the serious challenges to its very existence—both on account of lack of formal recognition by the majority of countries across the globe, as also threats of reunification by China—Taiwan continues to function quite effectively as a sovereign State.

continue being the sole political entity representing a unified China received a huge setback when the United Nations (UN), vide its resolution number 2758, recognised the People's Republic of China (PRC) as the only legitimate authority representing the whole of China; and removed Taiwan from the membership of the UN.[1] The establishment of diplomatic relations between the United States (US) and the PRC with effect from January 1, 1979,[2] and the consequent closure of the US diplomatic mission in Taipei, further eroded the status of Taiwan as an independent country.

All this while, China, having always considered Taiwan as its own territory, harboured clear intentions to reunify it at an opportune moment. China passed an 'Anti-Cessation Law' during the third Plenary of the 10th National People's Congress (NPC) to the effect that the "…[s]tate shall never allow the 'Taiwan independence' secessionist forces to make Taiwan secede from China under any name or by any means;"[3] and will "…use non-peaceful means and other necessary measures"—albeit as a last resort—to prevent Taiwan's cessation.[4]

Notwithstanding the serious challenges to its very existence—both on account of lack of formal recognition by the majority of countries across the globe, as also threats of reunification by China-Taiwan continues to function quite effectively as a sovereign State. It maintains its own national defence establishment and freely manages its foreign affairs. The main objective of Taiwan's foreign policy is to engender a favourable environment for national preservation and long-term development. Within the geopolitical constraints imposed upon it, Taiwan has reasonably

vibrant economic and cultural relations with many countries of the world, including India.

India-Taiwan Relations

India-Taiwan interactions have been quite restrained because India recognises the 'One China Policy' with the dispensation in Beijing being at its helm. However, with the establishment of the Taipei Economic and Cultural Centre (TECC) in New Delhi in 1995 and the India-Taipei Association (ITA) in Taipei, both countries and their people started to engage more closely with each other.[5] After about a quarter century of diligent perseverance, the restrictions in many facets of bilateral engagements have gradually loosened. Many bilateral agreements have been signed between the organisations and entities from both sides to bolster trade, connectivity and technology cooperation. Some important agreements/Memorandums of Understanding (MoUs) are mentioned below:[6]

- MoU on Scientific and Technological Cooperation-2007.
- Double Taxation Avoidance Agreement-July 2011.
- Customs Mutual Assistance Agreement-July 2011.
- MoU on Small and Medium-Sized Enterprises-December 2015.
- MoU between India's PHD Chamber of Commerce and Industry, and Taiwan Chamber of Commerce-June 2016.
- Air Services Agreement-September 2016.
- MoU on Promotion of Industry Collaboration-December 2017.
- MoU between Association of Indian Universities, and Taiwan Foundation for International Cooperation in Higher Education-2019.

With the above policy initiatives providing a veritable roadmap, India-Taiwan bilateral trade has grown considerably over the past decade. Significant progress was observed in the fields of trade, science and technology, critical supply chains, and education—particularly after the

opening of a second TECC office in Chennai in 2012. The total trade figures for 2022 crossed US$ 12.5 billion, rising from US$ 10.5 billion in 2021, and US$ 8.5 billion in 2020.[7] Taiwan has now decided to open a third TECC office in Mumbai, to further enhance trade and commerce.[8] Taiwan currently operates 26 Taiwan Education Centres (TEC) in India, which largely teach Chinese language to Indian students. Taiwan also offers language and academic fellowships to Indian scholars and students in Taiwanese universities and institutions.

While bilateral trade, investment and cultural relations have maintained a positive momentum; the conversations on ongoing geopolitical dynamics, national security and maritime order have been rather muted. This is probably on account of existing foreign policy constraints. However, India, in the recent past, appears to have adopted a more nuanced position on these issues while seeking greater engagement with Taiwan. A scholar, in fact, posits that the emergence of the Indo-Pacific construct, the onset of the COVID-19 pandemic and China's aggressive behaviour were the main triggers responsible for transformational changes in India-Taiwan relations since 2020.[9]

Both countries have also shown the resolve to discuss the maritime security situation in the Indo-Pacific and the current challenges posed to the 'rules-based order' therein. Taiwan sees a great role for 'think-tank diplomacy as the fifth pillar' of its 'New Southbound Policy (NSP)' of 2016 for establishing regional connections. Accordingly, the Taiwan-Asia Exchange Foundation (TAEF), a think tank affiliated with Taiwan's Ministry of Foreign Affairs, has built institutional linkages with India's National Maritime Foundation (NMF)[10] and the Observer Research Foundation (ORF).[11] The TAEF and ORF also held the first Taiwan-India Dialogue in October 2022 to discuss the security situation in the Indo-Pacific region and the prospects of India-Taiwan partnership in such a scenario.[12] The Chairman of NMF also participated in the latest edition of the 'Ketagalan Forum: Indo-Pacific Security Dialogue-2023'

organised by Taiwan's Ministry of Foreign Affairs.[13]

China's Taiwan Unification Gambit—Portends for Conflict

The security situation across the Taiwan Strait presents quite a tenuous picture, with China having adopted an overtly proactive stance over the past couple of years, particularly after the visit of Ms. Nancy Pelosi, Speaker

> **Various official pronouncements, media articulations and White Papers have progressively ratcheted up the issue of national reunification, in tandem with the increasing diplomatic, informational, military and economic heft of China.**

of the US House of Representatives in August 2022. The overt display of increased Chinese naval manoeuvres in the Strait, as also in waters surrounding Taiwan—with the PLA Air Force aircraft violating Taiwan's ADIZ and also flying across the median line virtually on a daily basis—has heightened the sense of alarm in Taiwan, and indeed across the Indo-Pacific region. The high intensity of PLA's aggressive brinkmanship in the Taiwan Strait was particularly noticeable on September 17, 2023 when a large number of PLA Navy ships were observed to be operating therein, along with many PLA Air Force (PLA AF) aircraft. One hundred and three PLA AF aircraft flew in the Taiwan Strait on that day, of which 40 crossed the median line and violated Taiwan's Air Defence Identification Zone (ADIZ) in its south-western and south-eastern sectors. The intruding aircraft included the Sukhoi-30, J-10, J-11, and J-16 modern fighters, along with Y-20 aerial refuellers and KJ-500 Airborne Early Warning and Control (AEW&C) aircraft.[14]

However, such a hard-line posture adopted by China has not come about, all of a sudden. Various official pronouncements, media articulations and White Papers have progressively ratcheted up the issue of national reunification, in tandem with the increasing diplomatic,

informational, military and economic heft of China. The Chinese White Paper of 1993 on 'The Taiwan Question and Reunification of China' sought to emotionally link the origin of the Taiwan issue to the country being subjected to "aggression, dismemberment and humiliation" by foreign powers during the last century.[15] The tone, tenor and language of that White Paper was almost entreating, seeking the understanding of the world towards Beijing's interpretation of the vexed issue. China, then headed by President Jiang Zemin, had a GDP of less than US$ 500 billion, with 157 countries having accepted the 'One China Principle.'

China released another White Paper titled 'The Taiwan Question and China's Reunification in the New Era' in August 2022. The very title of this White Paper connoted that China had undergone a "historic transformation" in the intervening three decades; and that the "rejuvenated China of the new era" considered this time as "a new starting point for reunification".[16] The stridency of tone and the hard-line was quite evident from the terse business-like assertion: "We will always be ready to respond with the use of force or other necessary means to interference by external forces …"[17]

Comparison of these two white papers, provides a great insight into the evolving harder-line resolve of Chinese intent vis-à-vis Taiwan. It is quite apparent that contemporary China under President and Party General Secretary Xi Jinping, with a GDP exceeding US$ 17.5 trillion, and having diplomatic relations with 181 countries, based on the 'one-China Principle'; believes that this is perhaps the right moment for attempting 'reunification'.

Therefore, the question which troubles the strategic community worldwide is: Will China be emboldened by the 'special military operation' which Russia is progressing in Ukraine? The long-cherished wish of China which sees 'reunification' as its unfinished agenda, and in light of the increasing conviction of the current Chinese leadership

about the appropriateness of the timing and confidence in the nation's capabilities to pull this off; it could most likely happen, sooner rather than later. When and how is the only variable yet to be ascertained. There is though, considerable speculation in the global media with regard to this ominous event taking place within the timeline of 2027.[18]

Effect on Indian Interests

If such a cataclysmic eventuality were to actually come about, then the global security order will certainly be impacted. Since the Taiwan Strait and the adjoining East and South China Seas are critical sea lanes for global trade and energy flow; the emergent situation will have dangerous ramifications for the whole of the Indo-Pacific region. India having important stakes in the Indo-Pacific, both, geopolitically and economically, will also be affected to a great extent. The ongoing bilateral trade with Taiwan would certainly be disrupted in the short-to-medium term. Since more than 55 per cent of India's bi-directional trade by volume passes through the international sea lanes (ISLs) of the Pacific Ocean, the resultant regional instability would pose serious risks to its safe transit. In addition, the fledgling technology collaboration and FDI with Taiwan would suffer a huge setback.

None of these outcomes can, however, cause grave harm to India's national interests. An economically resurgent India having inbuilt diversity in its critical supply chains can certainly take this setback in its stride. India instead, has to be mindful of its maritime security interests in proximate waters getting adversely affected as an indirect consequence of the Taiwan contingency. The benign-sounding role of the PLA Navy to "conduct international cooperation in distant waters"—first articulated in its 2008 Defence White Paper[19]—had by 2019 gradually evolved to "safeguarding of China's maritime rights and interests", including those of overseas Chinese people, organisations and institutions.[20]

The PLA Navy with more than 370 blue water ships has already become larger than the US Navy, and hence the largest in the world in terms of numbers, and is projected to grow to about 435 units by 2030.

The PLA Navy with more than 370 blue water ships has already become larger than the US Navy, and hence the largest in the world in terms of numbers, and is projected to grow to about 435 units by 2030.[21] In the contemporary geopolitical scenario, the bulk of this large Chinese naval force will be deployed in and around the Western Pacific Ocean. The Taiwan issue and long-standing security guarantee offered by the US by way of forward and actively deployed US Navy in the Pacific Ocean are, of course, the top concerns for Beijing. Considering the additional force requirement for dominance in other hotspots like the East and South China Seas, the immediate and emergent focus of the Chinese political and military leadership continues to be closer home.

At present, six to eight PLA Navy ships are generally present in the Indian Ocean Region (IOR). These are often supplemented by two to four research, survey, hospital, intelligence collection and space-telemetry ships. This empirically works out to less than 5 per cent of the PLA Navy's total force level, a number highly inadequate for any credible posturing. In the event of Taiwan getting reunified—whenever that happens—a major driver for the employment of a large Chinese naval force in the Western Pacific Ocean would no longer exist. The subsequent deployment of the PLA Navy then, would obviously be towards the Indian Ocean in large numbers. When this begins to happen in right earnest, the hitherto-before prominence that the Indian Navy enjoyed in and around its primary areas of maritime interest would come under serious challenge. When seen in the context of strained bilateral relations on account of the flaring up of the India-

China boundary question in the recent past and the situation likely to remain so in the foreseeable future the Indian maritime security would definitely be threatened. To place the level of threat in perspective, even 20 per cent of the PLA Navy's operationally employable warship inventory works out to more than 50 ships. China's pre-existing "*higher than mountains and deeper than oceans*" friendship with Pakistan[22]— which has been a troublesome neighbour all along in its own right— will further compound the threat quotient for India in the maritime domain. In this scenario, the capabilities and resolve of India's maritime security apparatus would be severely tested.

Options for India

It is therefore in India's interest to ensure that Taiwan continues to exist as an independent State, free from overt threats of reunification. Since India is located so far away from Taiwan, it would be quite unrealistic for New Delhi to contribute militarily in case of a China-Taiwan conflict. Nonetheless, unconfirmed media reports have speculated that the Chief of Defence Staff (CDS) had ordered a study within the Armed Forces about the scenarios of China attempting a reunification by force; and the possible options for the Indian Defence Forces in such a scenario.[23] However, various other options to indirectly mitigate the possibility of this 'reunification' contingency, can certainly be considered; and may in fact, already be under unstated implementation.

The Indian defence force level and heightened posture along the 'Line of Actual Control' (LAC) which has been in place since mid-2020, may occasionally be raised further to coincide with specific events like in the run-up to Taiwan's national elections or when excessive Chinese brinkmanship in Taiwan Strait is observed. It will convey a strategic message of nuanced Indian solidarity with Taiwan, in addition to keeping the PLA second-guessing whether a second front from an opposite axis will go alive or not.

> **India has rejected the China-Pakistan Economic Corridor (CPEC), a part of the Chinese 'Belt and Road Initiative (BRI), because the project ignores its core concerns on sovereignty and territorial integrity.**

The issue of keeping the PLA busy on multiple fronts from different directions can also be actively considered by the QUAD grouping. Japan may be requested to become more proactive with respect to the employment of its naval and air force assets off the Senkaku islands and Chunxiao gas fields. The visible increase in Japan's proactive engagement with the Philippines—with nearly half a billion US dollar loan to build five patrol vessels in addition to providing two large ships to its Coast Guard—in the context of Chinese aggressive posturing in the South China Sea, is also a step in right direction.[24] Continual cross-strait passage of US naval ships coupled with the freedom of navigation operations (FONOPs) around the Chinese-claimed features in the Paracel and Spratly chain of islands[25] and air surveillance missions in the South China Sea will also continue to engage sizeable attention and effort of the PLA forces.

India has rejected the China-Pakistan Economic Corridor (CPEC), a part of the Chinese 'Belt and Road Initiative (BRI), because the project ignores its core concerns on sovereignty and territorial integrity.[26] Since part of CPEC passes through the Pakistan-occupied Kashmir (POK), India could formally start using the acronym CPOKEC (China-Pakistan Occupied Kashmir Economic Corridor) to convey its opposition in a symbolic riposte. In fact, the usage of this nomenclature (CPOKEC) is already gaining traction in the Indian geo-strategic narrative.[27]

India must also proactively join the international community in every possible forum to oppose the attempts by China to unilaterally change the status quo in the South China Sea with regard to its illegal

and unlawful claims on many features and associated maritime zones therein. In this regard, India's nuanced change in position with respect to the 2016 ruling by the Permanent Court of Arbitration in favour of the Philippines, wherein New Delhi called for "… the need for peaceful settlement of disputes and for 'adherence' to international law, especially the UNCLOS and the 2016 Arbitral Award on the South China Sea …" is a great step.[28]

Conclusion

Despite the changing geopolitical circumstances, India continues to retain its official 'One China policy'. In December 2021, in response to a question in Rajya Sabha on whether India was looking forward to augment its diplomatic, economic, trade and bilateral relationship with Taiwan to a strategic level; the Minister of State replied that the "Government of India's policy on Taiwan was clear and consistent. The Government only facilitates and promotes interactions in areas of trade, investment, tourism, culture, education and people-to-people exchanges."[29]

However, in the currently changing geopolitical reality, both, India and Taiwan face an increasingly overbearing adversary—albeit in different domains—who believes in leveraging its comprehensive national power (CNP) to engage in a revisionist expansive agenda. It is, therefore, not an option for either country to accept the adversary's ploy to forge a 'new normal'. In such circumstances, it is for New Delhi to take a call on whether or not, there should be a significant change of stance in India-Taiwan relations; and also, to decide when, and by how much.

In the meanwhile, India must find ways and means within the confines of its existing foreign policy choices to safeguard its national interests by a combination of its own endeavours, as well as lending its support to multilateral organisations/forums which call for rules-based order and resolution of national disputes through dialogue and peaceful

means. Because the antagonist must be made to realise that "*This is not an era of war*", as Prime Minister Modi has publicly articulated at various global forums.[30]

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Amphibious Operations: Do We Need a Hard Reset?

Sarabjeet S Parmar

Abstract

Mankind has been landing troops by sea-going vessels on foreign shores since time immemorial. In 1200 BCE, to attack Troy, the Greeks had to make a shore landing, as did the Persians prior to the Battle of Marathon in 490 BCE. Both the world wars saw several amphibious landings, the most prominent ones being Gallipoli in 1915 and Normandy in 1944. During World War 2 the Pacific Theatre witnessed many amphibious operations. Over time the complexity of amphibious operations increased with technologically enhanced land power, and the advent of maritime and air power, all of which necessitated a high degree of joint planning and flexibility of execution. This article will analyse amphibious operations in the contemporary context and examine if there is a need for a hard reset.

Introduction

Amphibious operations were essentially used, and later doctrinally and strategically designed, for landing armies on foreign shores and carrying

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The armed forces of many maritime nations, who posit amphibious operations as an essential element of both hard and soft power, developed the requisite capacity and capability and produced and evolved doctrines and related strategies.

the conflict onto the territories of the adversary, either sovereign or occupied. Well before the term came into vogue, mankind had been landing troops on foreign shores since time immemorial. In 1200 BCE, the Greeks landed an army to attack Troy, as did the Persians prior to the Battle of Marathon in 490 BCE. As a part of combined operations, World War I saw landings at Gallipoli in 1915, while the Second World War saw several amphibious operations—as we now understand them—in the Mediterranean and the Pacific theatres, and the famous 1944 Normandy landings. These operations brought home the complexity and requirement for joint planning and as Captain Lidell Hart is known to have commented in 1939, "A landing on a foreign coast in the face of hostile troops has always been one of the most difficult operations of war." However, "with more than 70 per cent of the Earth covered in water, amphibious forces use waterways as manoeuvre space, giving them a level of flexibility, speed, and survivability often unmatched by land forces."[1] Over time with the advent of technology, the complexity of amphibious operations increased further which necessitated a high degree of joint planning and more importantly, flexibility of execution. "There are a number of historical examples where individuals have forecasted the demise of amphibious operations due to technological changes."[2] However, the armed forces of many maritime nations, who posit amphibious operations as an essential element of both hard and soft power, developed the requisite capacity and capability and produced and evolved doctrines and related strategies. This article will analyse amphibious operations in the

contemporary context and examine if there is a need for a hard reset in the Indian context.

Doctrines, Strategies, and Capability

The Seven Years Anglo-French War, fought from 1756 to 1763, has been long marked by historians as the war that brought about evolutionary leaps in operational art, and through revolutionary methods introduced amphibious operations as a distinct military theory.[3] Around the mid to late 18th century four principles emerged which have guided amphibious operations for centuries:[4]

- Amphibious operations are not meant to win wars on their own and are a larger national-strategic framework.
- To be effective, amphibious operations should target the Centre of Gravity (CoG) both physically and mentally.
- To be successful amphibious operations require sufficient mass.
- Even if the above criteria are met the success of an amphibious operation would depend on how well the planners, commanders and troops are equipped, trained, and practiced.

Nations that understand the necessity of amphibious operations and the use of amphibious assets as part of soft power can be placed under three broad categories:

- Island nations like the United Kingdom (UK).
- Nations which have islands like India.
- Nations who engage and operate in areas with numerous islands and have understandings or alliances that ensure the protection of sovereignty like the United States of America (USA).

However, in today's contemporary world the size of defence budgets, the number of suitable assets and troops available, and the current deployment and prioritisation of operations are impacting the

maintenance and preparedness of amphibious-related assets, and hence amphibious operations. Nonetheless militaries the world over continue to develop and update doctrines and strategies that include these operations as a part of conflict, and soft power operations, as mentioned earlier. As short case studies, this section will examine doctrines, strategies, and capabilities of the UK, USA, and China.

United Kingdom. UK's joint doctrine, *UK Maritime Power*, places and explains amphibious-related aspects under Chapters 3 and 4 that look at the foundations and employment of maritime power, respectively.[5] Four main issues that emerge from the doctrine are as follows:[6]

- Under maritime power projection, amphibious forces as part of an encompassing maritime task group, will enhance maritime manoeuvre and be used to project force ashore.
- The amphibious force can operate independently or with allies and partners and will comprise specialist amphibious ships, the landing force (LF), and a tailored air group.
- Amphibious ships will be from the Royal Navy (RN), the Royal Fleet Auxiliary (RFA), and when required chartered from the merchant navy.
- The Royal Marines (RMs) are the main land component of amphibious operations. They are specialised in amphibious operations, are fully integrated with the RN's amphibious ships, and can operate without support from the host nation. The LF will also include elements of the British Army.

As a maritime island power, the UK fully understands the need for amphibious capability and maintains a core capability of two RN amphibious ships (Landing Platform Dock-LPD), three RFA amphibious ships (Landing Ship Dock-LSD), and an LF of one RM brigade and two amphibious squadrons.[7] To meet the increasing challenges and risks the UK is transforming its amphibious forces and has been looking at investing

40 million GBP to modernise the RM element of its LF, and 50 million GBP to modernise one RFA amphibious ship.[8] Although this force would be supported and augmented by other elements, the modernisation and numbers would still limit the envelope of amphibious operations in both operational areas and the scope of attainable objectives. The Integrated Review Refresh 2023 states that "The most pressing national security and foreign policy priority in the short-to-medium term is to address the threat posed by Russia to European security",[9] hence this could raise the budgetary priority of land-centric military capability, which could impact the amphibious capability.

United States of America. From World War II onwards, the USA probably had the most experience in amphibious operations. The US amphibious doctrine has evolved considerably from the 1938 Landing Operations Doctrine, which paved the way for the transformation of the US military into an amphibious assault force. Over time the doctrines indicated four types of amphibious operations—Assault, Raid, Demonstration and Withdrawal. These hard power aspects had also been adopted by other nations. The soft power aspect, which was added subsequently, was changed in the 2014 Joint Publication 3-02 from "amphibious support to other operations" to "amphibious forces support to crisis response and other operations".[10] This has been carried forward to the 2019 doctrine validated on January 21, 2021 and the relevant paragraph under **AF (Amphibious Force) Support to Crisis Response and Other Operations** reads as follows:[11]

> *"AFs routinely conduct amphibious operations in response to crises and in support of other operations such as security cooperation, foreign humanitarian assistance (FHA, which includes disaster relief), non-combatant evacuation operations (NEOs), peace operations, sea control, or recovery operations. These operations contribute to conflict prevention and crisis mitigation."*

> **Given the different geographical areas in which the US will engage in strategic competition with both nations, the US amphibious element could be of more value against China.**

The US 2022 National Security Strategy under global priorities looks at "Out-Competing China and Constraining Russia", and places China as "the only competitor with both the intent to reshape the international order and, increasingly, the economic, diplomatic, military, and technological power to do it."[12]

Given the different geographical areas in which the US will engage in strategic competition with both nations, the US amphibious element could be of more value against China. This would mainly be due to the number of islands and defence treaty alliances the US has with nations in the Indo-Pacific, especially the South and East China Seas. Details of amphibious operational and related aspects have been covered in the US Marine Corp's second edition of the *Tentative Manual for Expeditionary Advanced Base Operations* dated May 2023, which indicates the importance of amphibious operations in the US[13] duly supported by the amphibious assets held by the US military, specifically under the US Indo-Pacific Command (INDOPACOM).[14]

China. It can be assumed that China's amphibious capability is focused on Taiwan, and the islands and reefs of the South and East China Seas. This is evident from the Chinese National Defence University 2020 publication titled, *The Science of Military Strategy*, which states the following under *Amphibious Combat Capability*:[15]

> *"Amphibious operations, also known as landing operations, refer to the ability to project marines and special forces on a campaign scale to implement amphibious operations across seas and landings (islands and reefs) […] amphibious landing operations capabilities mainly include large-scale weapon delivery capabilities, reconnaissance and early*

warning capabilities, coordinated command capabilities of various arms, and deep strike capabilities against targets."

> **It is evident that China places amphibious operations as a high-priority integrated joint operation to be conducted and supported by various arms of the PLA.**

On November 26, 2020, during a press conference, the Chinese Ministry of National Defence (MND) spokesperson announced the issuance of the *Guidelines on Joint Operations of the People's Liberation Army (Trial). He also stated that "*being the capstone of the combat doctrines system in the new era, *the guidelines* has a leading, overarching and fundamental standing, forms an integral part of the reform of military policies and institutions".[16]

It is evident that China places amphibious operations as a high-priority integrated joint operation to be conducted and supported by various arms of the PLA. China has added 17 large amphibious ships (LHA/LPD) since 2005.[17] The PLA is building naval amphibious and support assets, conducting regular amphibious exercises, and has allocated force levels to the theatre commands, specifically the Northern, Eastern, and Southern theatres to accordingly support the Chinese amphibious posture in the South and East China Seas.[18]

The Indian Context

In the Indian context, the credible use of amphibious assets falls under both hard and soft power. While amphibious operations fall under hard power, operations like NEO, Humanitarian Assistance and Disaster Relief (HADR) including Pandemic relief operations would fall under the purview of soft power.

Hard Power Aspects. With respect to hard power the Indian military has participated in several amphibious operations and exercises

and hence has experienced joint planning and operations. During World War I the Indian Army participated in the 1915 landings at Gallipoli. This was followed by amphibious operations that led to the reoccupation of Berbera in the Gulf of Aden later in 1941. This amphibious operation was the first combined operation conducted by the Indian Army and the Royal Indian Navy (RIN).[19] After independence three major hard power amphibious landings were carried out—in 1947, 1961, and 1971. These are covered in the subsequent paragraphs.

Post-independence in 1947, the Indian Armed Forces carried out amphibious operations off Junagadh, a princely state whose ruler was looking at acceding to Pakistan despite having no border with it. To ensure stability and peace the Indian Army was landed by the RIN in the first post-independence amphibious operation, called Exercise Peace, in three phases on October 5, October 17 and November 1, 1947.[20]

In 1961 during the liberation of Goa operations, amphibious operations were ruled out for four reasons.[21] These were good planning decisions because:

- At that time the IN did not have adequate assault landing craft for such an operation.
- The Indian Army had not been trained for amphibious operations.
- Due to strategic considerations for pressure from the Western countries, time was too short to conduct any kind of training.
- Lastly, it was felt that an inland approach was possible against a weaker enemy's land border, hence amphibious operations would not offer any imperative tactical advantage.

During the Goa operations, the capture of Anjadip Island was considered a primary task for the Naval Task Force as the Portuguese operations had originated from this island. The landings were conducted by the Indian Navy as "it was, however, assumed that there would be little or no resistance from the Portuguese personnel stationed on the island

and hence Naval landing parties as opposed to trained Army commandos were considered adequate for the task."[22]

The use of amphibious assets in a non-combat role by India has been increasing.

In the 1971 war against Pakistan, the main area considered for amphibious operations was the eastern theatre and the Eastern Naval Command catered for both diversionary and actual amphibious landings.[23] The landings called Operation Beaver were initially scheduled on December 12, 1971 but were finally conducted on December 15, 1971 at Reju Creek. The landings at Reju Creek were partially successful and due to difficulties experienced, the landing was shifted to Cox Bazaar overnight. This delay and shifting to Cox Bazaar were due to a variety of reasons that pointed to a lack of detailed joint planning.[24]

Soft Power Aspects. The use of amphibious assets in a non-combat role by India has been increasing. This use of amphibious assets, especially the larger ships, are considered more appropriate mainly for soft power operations angle due to three main reasons:

- There is adequate space available onboard, and the troop accommodation spaces can be used to carry people and stores required for HADR (including pandemic situations) and NEO.
- This space also provides the inherent flexibility of these assets being converted to hospital ships.

The deployment of military assets to address HADR and NEO has gained prominence, and the Indian military is increasingly being utilised for such operations, both nationally and internationally. Such operations fall under the purview of the Benign Role of the Indian Navy and nationally are placed under the ambit of 'Aid to Civil Authorities' and internationally as part of defence diplomacy. Internationally, such deployments since the 2004 Tsunami have added heft to India's contemporary claim to being the Preferred Security Partner and First Responder.

Doctrines, Strategies, and Capability

India is a continental nation with a long coastline and numerous islands and needs to balance the capability of addressing a diverse range of land and maritime threats and challenges. On the maritime front, the security and safety of the coastline and islands, and the essentiality of ensuring adequate deterrent value and a full conflict spectrum coverage requires amphibious assets and the capability to conduct amphibious operations. There are five doctrines and one strategy document that cover amphibious operations based on their inherent operational philosophies, mainly in the context of hard power. These are covered in the subsequent paragraphs.

The second edition of the Joint Doctrine Indian Armed Forces (JDIAF) published in April 2017 by the Headquarters Integrated Defence Staff (HQIDS) can be considered the joint capstone document where amphibious operations need more elaboration. It is understood that the first joint doctrine on amphibious operations, published in 2008, is under review, and is no longer available in the open domain. The new doctrine should amalgamate all inputs from the three Services and their doctrines and strategies in force, as this would be the guiding document for the theatre commanders, as and when the theatre commands are raised. The JDIAF devotes a paragraph to Amphibious Operations and states that:[25]

- These operations are conducted by all Services in an integrated manner to enable the army to land ashore from a sea approach in order to project power inland.
- These operations are carried out to capture territory which may be of the enemy's or own, which is occupied by the enemy. They may also be carried out to creep forward through island territory to reach the enemy's centre of gravity from the sea to deliver him a knockout blow, to deny a logistics hub to the enemy or just to pose a threat to the enemy to deter him from prosecuting operations elsewhere.

While the Indian Army (IA) Land Warfare Doctrine 2018 places amphibious capability as an imperative for force projection operations,[26] the cover page states that the doctrine is to be read in conjunction with JDIAF 2017.

The Indian Air Force (IAF) Doctrine 2022 does not mention the term amphibious operations. However, the support that can be provided is placed under tenets mentioned under the No War No Peace (NWNP) Air Strategy and the Wartime Air Strategy.

> **The Indian Air Force (IAF) Doctrine 2022 does not mention the term amphibious operations. However, the support that can be provided is placed under tenets mentioned under the No War No Peace (NWNP) Air Strategy and the Wartime Air Strategy.**

For example, under NWNP Air Strategy the following can be considered as main supportive elements—Information Dominance and Shaping Operations. Under Wartime Air Strategy most of the tenets may be used depending on the planning requirements of the amphibious operation, especially Favourable Air Situation and Coordinated Air Operations.[27]

- The *Indian Maritime Doctrine*, *National Strategic Publication 1.1,* updated in 2015 (IMD NSP 1.1) and the unclassified strategy document, *Indian Maritime Security Strategy: Ensuring Secure Seas, National Strategic Publication 1.2*, published in 2015 (IMSS 2015) both cover amphibious operations in some detail. IMD NSP 1.1 places amphibious operations as a method to directly influence land battles by projecting military power ashore from the sea.[28] IMSS 2015 looks at the standard four types of amphibious operations[29] mentioned earlier and states that "Such operations will remain valid and valuable in the Indian context, due to the coastal terrain in our primary areas of interest and our many islands [and] the IN will operate in close cooperation with the IA and IAF and will be prepared to undertake them as required for both defensive and offensive purposes".[30]

- It also states that as a "force projection operation, it will be conducted to prosecute further combat operations ashore, capture or recapture territories, obtain a site for an advance naval or air base, deny the use of an area or facilities like a port to the enemy, or to show presence" and that such an operation "will target the enemy's Centre of Gravity (CoG) or critical vulnerabilities".[31]

Given the area of operations, which have extended into the Indo-Pacific, the present strength of 17 amphibious ships[32] has limited carrying capacity and is hence considered inadequate to meet both hard power and soft power operations.

Conclusion

Presently, it is opined that there is no requirement for a hard reset. While hard power amphibious operations planning would consider all aspects, the advent of technology in the areas of surveillance and tracking, and the ability to bring firepower to bear on the amphibious force from longer ranges would require our amphibious operations to undergo a change. These would vary depending upon the nation and the adversary concerned. However, some aspects that merit attention are as follows:

- Though the soft power usage of amphibious assets is not linked to amphibious operations in both these capstone documents of the IN, the assets have been used extensively for such operations, especially HADR and during the COVID-19 pandemic. Therefore, the addition of soft power aspects as a fifth type of amphibious operation could be added to the joint doctrine under review as well as the army and naval doctrine and strategy documents.
- There is a need to increase the number of amphibious assets with large carrying capacities with stand-off beaching capability. These would add value to both hard and soft power amphibious operations.

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AI and the Potential to Create Digital Twins to Transform Military Logistics

Munish Tuli

"Predictive maintenance can reduce equipment downtime by 30 per cent to 50 per cent and increase its life by 20 per cent to 40 per cent"
"Businesses applying AI-driven forecasting to their supply chains can reduce errors by between 20 per cent and 50 per cent"

—McKinsey

Abstract

Efficient and reliable military logistics are essential to the success of military operations. When effectively integrated into logistics planning and decision-making, Artificial Intelligence (AI) can simplify complex logistics operations. Digital twins are digital representations of physical objects, systems, or processes. When powered by AI, digital twins have the potential to make military logistics smarter, more efficient, and cost-effective. It is proposed that all military equipment (embedded with sensors) and military depots in the Indian Army should have their AI digital twins created to facilitate predictive maintenance and AI-driven demand forecasting respectively. An

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AI digital twins have immense potential to revolutionise equipment maintenance by implementing predictive maintenance and optimising inventory management through AI-driven demand forecasts.

attempt has been made to explore and validate the proposed concepts through two prototype machine-learning projects. The article further delves into the implementation aspects of AI digital twin-based predictive maintenance and demand forecasting followed by key recommendations for adoption in the Indian Army.

What is an AI Digital Twin?

A digital twin is a digital representation of a physical object, system, or process. Once created, the digital twin remains associated with the entity it represents throughout its lifecycle.[1] Digital twins are used for multiple purposes: simulation, testing, maintenance, monitoring, and system integration. The digital twin must be continuously synchronised with its counterpart entity to ensure that it is always up to date. An AI digital twin, on the other hand, is a powerful combination of a digital twin and AI in one box. For example, an AI digital twin may include the entity's data and machine learning models trained on that data, both encapsulated into one entity. AI digital twins have immense potential to revolutionise equipment maintenance by implementing predictive maintenance and optimising inventory management through AI-driven demand forecasts.

Predictive Maintenance

With the advancements in AI, machine learning, and the ability to collect and process real-time sensor data, there is a paradigm shift in the equipment maintenance philosophy from preventive to predictive maintenance. It is proposed that every military equipment (embedded

with sensors) in the Indian Army must have a companion AI digital twin to facilitate predictive maintenance during its useful life. The digital twin is created at the time of induction of the equipment into service and remains associated with it throughout its operational life. The digital twin will be erased while its O&M (operation and maintenance) data is archived for future analytics after the equipment is declared beyond economical repair (BER) and withdrawn from service.

The digital twin is initially machine-trained on the generic data (data extracted from the archived O&M data of other equipment of the same type and model). Over time, as more data on the equipment is accumulated, its digital twin learns specific patterns based on the equipment's peculiar characteristics and usage. This enables the digital twin to facilitate customised predictive maintenance by making progressively more accurate predictions of the equipment's health parameters over time.

The sensory data generated by the equipment not only depends on the type, model, and age of the equipment but also the intensity of its usage. During periods of high-intensity usage such as training exercises and actual operations, the equipment may experience greater wear and tear. This may affect the sensor readings, resulting in unique patterns in the data that are continuously learned by the machine learning algorithms during the training process.

Current use cases of AI digital twins include predicting the remaining useful life (RUL), probability of equipment failure, and anomaly detection. Figure 1 depicts an AI digital twin of military equipment, and Figure 2 depicts its evolution during its lifetime.

Prototype Machine Learning Project 1: AI Digital Twin for Predictive Maintenance of Machines
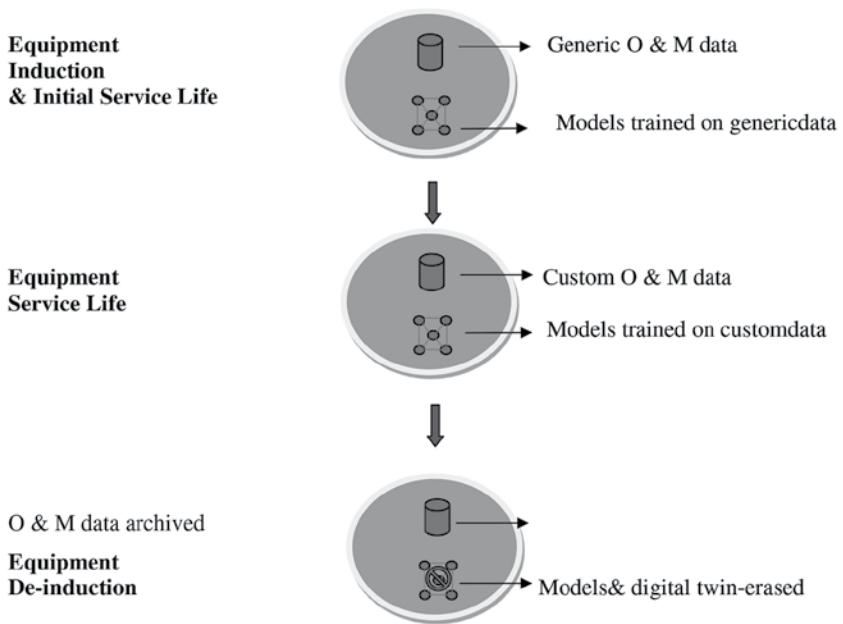
A prototype machine learning project was implemented to validate the proposed concept of AI digital twin-based predictive maintenance

Figure 1: Military Equipment and its AI Digital Twin

Military Equipment   **AI Digital Twin**

(Data and Models Encapsulated)
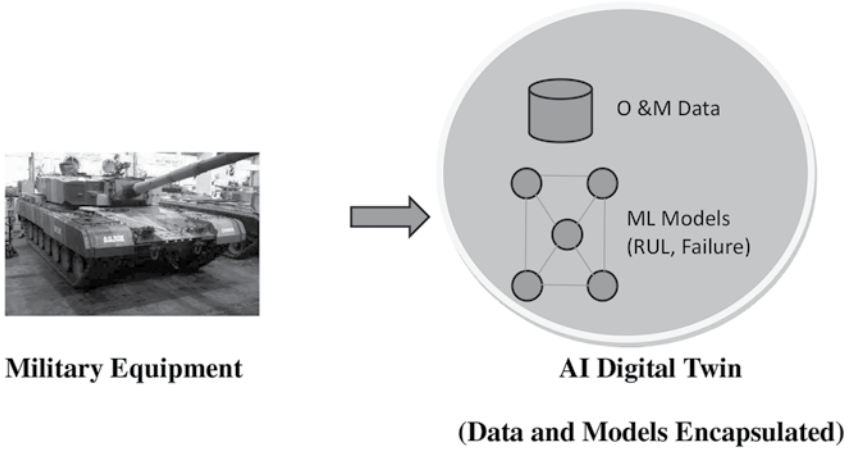
Source: Author.

Figure 2: Evolution of AI Digital Twin

Source: Author's own.

of machines. The AI digital twin was trained on the O&M data (sensor readings) of the machines to predict their RUL and failure probability. The dataset used for training and evaluation was downloaded from Kaggle.[2] It consists of 28,056 samples of daily sensor readings (voltage, rotation, pressure, vibration) from 100 machines of different types, models, and ages recorded over one year of operation. Each sample is labelled with the RUL (number of days left until the next failure) and a binary variable indicating whether the machine failed on that day. A machine is considered to have failed when its RUL reaches zero. In the project, four separate machine learning models forming part of an AI digital twin of a machine were trained and evaluated.

Let us assume that a machine (ID 39) has just been inducted into service. The maintenance organisation creates an AI digital twin of the machine at the time of its induction into service to facilitate predictive maintenance throughout its lifecycle. Initially, the digital twin does not have its own historical O&M (sensor data). The O&M data of the machine is recorded daily and labelled as its operational life progresses.

To facilitate predictive maintenance during the initial service life (Phase 1), labelled sensor data from other relatively newer machines of the same type and model (less than two years of age) is utilised to prepare a generic dataset. The machine learning models of the AI digital twin are then trained on the extracted generic dataset to predict the RUL and failure probability of the newly inducted machine (ID 39) during the initial phase of its life (Phase 1). The first machine learning model (Extra Trees Regressor) was trained on the training data and evaluated on the test data (sensor data obtained from the target machine ID 39 during its second week of operation). The model predicted the RUL in days for each of the test samples and achieved a Mean Absolute Error (MAE) of 15 days on the test data. The predicted RUL vs actual RUL during Phase 1 is given in Table 1 below:

Table 1: Phase 1 Predicted RUL vs Actual RUL

Test Sample	Actual RUL (Days)	Predicted RUL (Days)
1	79	64
2	78	63
3	77	61
4	76	60
5	75	59
6	74	57
7	73	57

Source: Author's creation.

A second machine learning model, the Extra Trees Classifier, was trained on the training data to predict the probability of machine failure. The model was then evaluated on the test data. Overall, the model achieved a prediction accuracy of 99 per cent. However, it can be observed that the model did not perform well in detecting machine failures. Only two out of three actual failure instances were predicted correctly, and false alarms were raised for three instances. The model's predictions versus the ground truth can be found in Table 2.

Table 2: Phase 1 Model Predictions vs Ground Truth

Ground Truth	Model Predictions ⟶	
↓	No Machine Failure	Machine Failure
No Machine Failure	294	03
Machine Failure	01	02

Source: Author's creation.

During Phase 2 (after 10 months of operational life), the digital twin is retrained using its custom O&M data to improve the accuracy and reliability of predicting customised RUL and failure probability. A third machine learning model, specifically the Extreme Gradient Boosting Regressor, was trained on the training set and then evaluated using test data. The test

data consisted of sensor data from the first week of operation of the target machine with ID 39 after it had been in operation for 10 months. The model successfully predicted the RUL for each of the test samples and achieved a zero MAE on the test data. This significant improvement in prediction accuracy can be seen in Table 3, which compares the predicted RUL to the actual RUL.

Table 3: Phase 2 Predicted RUL vs Actual RUL

Test Sample	Actual RUL (Days)	Predicted RUL (Days)
1	6	6
2	5	5
3	4	4
4	3	3
5	2	2
6	1	1
7	0	0

Source: Author's creation.

A fourth machine learning model, the Extreme Gradient Boosting Classifier, was trained using the training data and then evaluated using the test data. Overall, the model achieved a prediction accuracy of 100 per cent. The model's predictions, in comparison to the ground truth, can be found in Table 4.

Table 4: Phase 2 Model Predictions vs Ground Truth

Ground Truth	Model Predictions ⟶	
	No Machine Failure	Machine Failure
No Machine Failure	56	0
Machine Failure	0	1

Source: Author's creation.

Efficient military logistics balances demand with supply and optimises inventory levels of military stores and equipment. This is especially true in military operations where demand can be highly volatile and unpredictable, and there can be multiple exogenous factors such as weather and terrain that can significantly affect demands.

Apropos, it is validated that the AI models trained on the custom O&M data (sensor data) of equipment can accurately predict its RUL and failure probability from the sensor data with high accuracy, thus facilitating predictive maintenance.

Demand Forecasting

Efficient military logistics balances demand with supply and optimises inventory levels of military stores and equipment. This is especially true in military operations where demand can be highly volatile and unpredictable, and there can be multiple exogenous factors such as weather and terrain that can significantly affect demands. AI can be leveraged by military logisticians to accurately forecast the demands of a large inventory of stores stocked in military depots and help maintain their optimal levels. This will reduce wastage by reducing overstocking and inefficiency due to understocking or stockouts. Multiple factors appear as patterns, such as trends and seasonality, in the historical demand and supply time series data that can be effectively discerned by machine learning algorithms. Therefore, it is proposed that the Indian Army adopt AI-driven demand forecasting for optimising inventory management in military depots thereby transforming its logistics decision-making process.

Some common techniques that can be used for demand forecasting are trend analysis, regression analysis, and moving averages. A classical demand forecasting method that is popularly used is moving averages. This approach is appropriate because it is a simple and effective way to smooth out the data and make it easier to identify patterns. The moving averages

method is also easy to interpret and can be used to make predictions about future demand. Good statistical methods such as Simple Moving Averages (SMA), Weighted Moving Averages (WMA), and Exponential Moving Averages (EMA) have been used by logisticians to estimate future demands and plan the supply chain to fulfil the demands in the best possible manner. However, AI-driven techniques can do the job more realistically and faster, thus reducing the problems of understocking or overstocking in stores or warehouses.

In the realm of demand forecasting, an AI digital twin of a military depot is a digital entity that encapsulates its historical inventory data as well as machine learning models trained on that data to periodically (daily, weekly, monthly, or quarterly) forecast future demands of stores. Over time, as more and more inventory data gets accumulated, the accuracy of demand forecasting by the machine learning models also improves. An AI digital twin of a military depot allows for the accurate forecasting of demands, thus resulting in reduced incidents of stockouts and overstocking and thereby improving the efficiency of the functioning of depots. It is proposed that all military depots in the Indian Army, including the Field Ordnance Depot, Fuel Oil and Lubricants Depot, Ammunition Depot, Vehicle Depot, Medical Stores Depot, and Supply Depots, must have associated digital twins created for accurate demand forecasting. Figure 3 depicts the representation of the AI digital twin of a military depot.

Figure 3: AI Digital Twin of a Military Depot
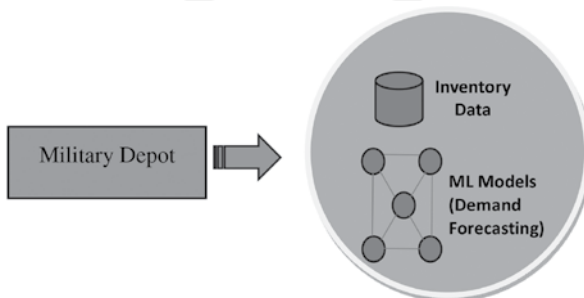
Prototype Machine Learning Project 2: AI-Digital Twins for Demand Forecasting of Stores

The dataset for the machine learning project was downloaded from Kaggle. In this project, we will consider a store (military depot) with an inventory of 10 items (a typical military depot will have an inventory comprising thousands of items). The dataset contains daily sales data of stores for five years. Our objective is to train machine learning models on the historical sales data of a store to forecast the weekly, monthly, quarterly, and yearly demands of items and compare the accuracy of our AI-based demand forecasts with the traditional moving averages method as explained below:

- **Weekly Demand Forecasts:** The AI models predicted the daily sales for the next week with a mean absolute error (MAE) of 4.74 across all 10 items. On the other hand, the traditional moving averages method (averaging the past seven days' sales data and moving forward) produced a higher MAE of 7.39. Overall, the machine learning models significantly reduced the weekly demand forecast errors by 35.86 per cent compared to the legacy moving averages method.

- **Monthly Demand Forecasts:** The AI models predicted the weekly sales for the next month with an MAE of 73.30 across all 10 items. On the other hand, the traditional moving averages method (averaging the past four weeks of sales data and moving forward) produced a higher MAE of 87.07. Overall, the machine learning models reduced the weekly demand forecast errors by 15.8 per cent compared to the legacy moving averages method.

- **Quarterly Demand Forecasts:** The AI models predicted the monthly sales for the coming quarter with an MAE of 82.93 across all 10 items. On the other hand, the traditional moving averages method (averaging the past three months of sales data and walking forward) produced a higher MAE of 294.10. Overall, the machine learning models significantly reduced the quarterly demand

forecast errors by 71.77 per cent compared to the legacy moving averages method.

- **Yearly Demand Forecasts:** The AI models predicted the quarterly sales for the coming year with an MAE of 500.50 across all 10 items. On the other hand, the traditional moving averages method (averaging the past three-quarters of sales data and moving forward) produced a higher MAE of 711. Overall, the machine learning models reduced the quarterly demand forecast errors by 29.6 per cent compared to the legacy moving averages method

It is seen that AI-based demand forecasts can significantly reduce forecasting errors between 15 and 70 per cent compared to the legacy moving averages. Tables 5 to 8 show the AI-based weekly, monthly, quarterly and yearly demand forecasts of items for the given store.

AI-Digital Twins: Implementation Aspects

A suggested approach for implementing AI Digital twins would be to develop and host a centralised web application and data in the Army Cloud (Data Centre). The architecture of AI digital twin-based predictive maintenance is depicted in Figure 4.

The various components of the cloud deployment scenario described above are explained as follows:[3]

- **AI Digital Twin Application Server (VM)**. The AI Digital Twin server is hosted as a Virtual Machine (VM) on the Army Cloud. The server runs a web application and has virtual storage for storing the O&M (labelled sensor data) data and the trained machine learning models. Users securely access the web application over the Army Data Network (ADN).
- **Project Management Team (PMT)**. The PMT is responsible for detailed system analysis design and application development. The team

Table 5: AI-Based Daily Demand Forecast for Next Week

	store_1_item_1	store_1_item_10	store_1_item_2	store_1_item_3	store_1_item_4	store_1_item_5	store_1_item_6	store_1_item_7	store_1_item_8	store_1_item_9
2017-12-25 00:00:00	11	45	37	20	12	10	35	31	46	28
2017-12-26 00:00:00	14	53	44	24	13	12	43	39	53	33
2017-12-27 00:00:00	15	54	45	21	14	13	41	39	54	32
2017-12-28 00:00:00	16	59	47	23	16	14	43	44	56	33
2017-12-29 00:00:00	18	65	50	25	15	14	48	47	64	33
2017-12-30 00:00:00	20	71	55	27	17	16	52	53	65	38
2017-12-31 00:00:00	21	78	59	30	18	17	51	56	59	38

Source: Author's own.

Table 6: AI-Based Weekly Demand Forecast for Next Month

	store_1_item_1	store_1_item_10	store_1_item_2	store_1_item_3	store_1_item_4	store_1_item_5	store_1_item_6	store_1_item_7	store_1_item_8	store_1_item_9
0	129	528	449	228	139	139	411	413	531	364
1	139	531	447	212	132	129	370	356	529	365
2	131	535	449	247	157	135	377	377	528	342
3	143	543	447	264	151	136	435	373	531	368

Source: Author's own.

Table 7: AI-Based Monthly Demand Forecast for Next Quarter

|	store_1_item_1	store_1_item_10	store_1_item_2	store_1_item_3	store_1_item_4	store_1_item_5	store_1_item_6	store_1_item_7	store_1_item_8	store_1_item_9
0	708	2070	1907	1101	688	610	2012	1851	2367	1742
1	696	2356	1735	1220	688	597	1953	1876	2308	1672
2	536	1588	1460	782	586	485	1254	1431	1921	1105

Source: Author's own.

Table 8: AI-Based Quarterly Demand Forecast for Next Year

	store_1_item_1	store_1_item_10	store_1_item_2	store_1_item_3	store_1_item_4	store_1_item_5	store_1_item_6	store_1_item_7	store_1_item_8	store_1_item_9
0	1859	9908	4146	2587	1532	1345	3672	4862	5198	3885
1	1857	7571	5855	3803	2289	2201	4992	6024	7954	5638
2	2244	6299	4933	3803	1885	1564	4992	6029	7960	5279
3	1488	6071	4933	3041	1885	1564	4992	4057	6474	3546

Source: Author's own.

**Figure 4: AI-Digital Twin-Based Predictive Maintenance:
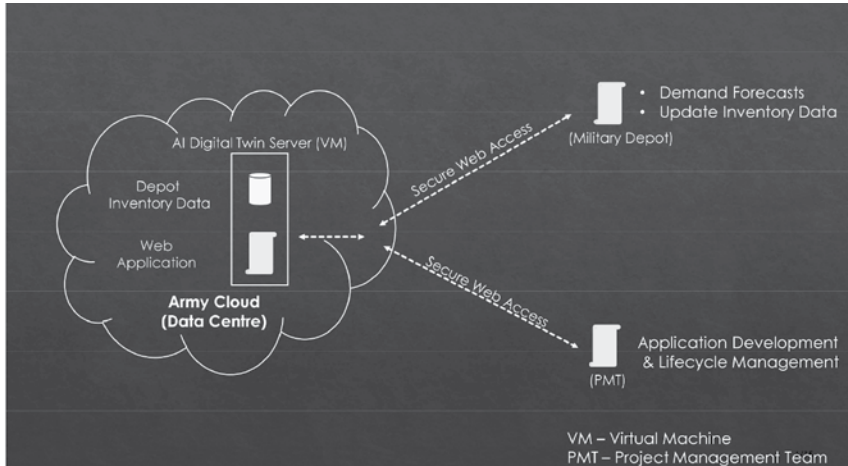Cloud Deployment**
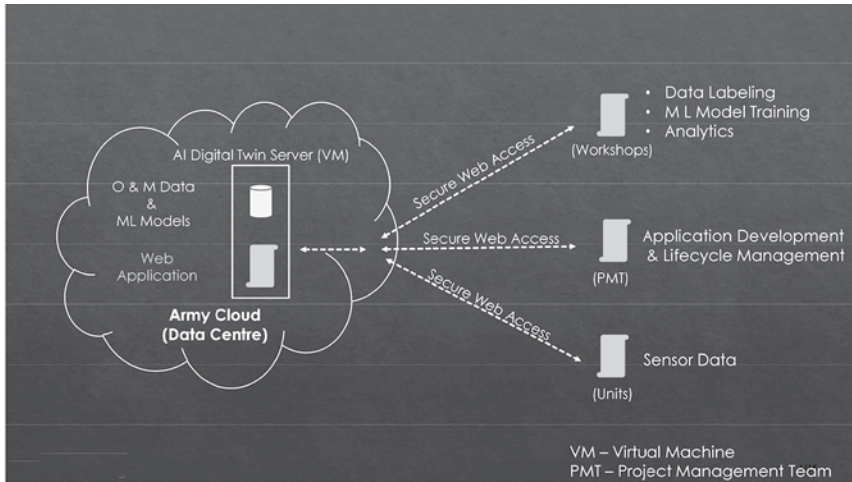
Source: Author's own.

ensures complete life cycle management support for the application, including hosting, upgrades and updates, monitoring proliferation and use, and resolving queries.

- **Workshops**. All workshops have secure access to the application through the web interface. They perform tasks such as labelling sensor data uploaded by user–units, machine learning model training, and analytics.

- **Units**. User units are responsible for uploading sensor data collected from the equipment's embedded sensors. In the Internet of Things (IoT) environment, the sensory data is aggregated through an IoT gateway and uploaded to the application data store through the provided interface.

Similarly, a suggested cloud deployment architecture for the AI Digital Twin-based demand forecasting for the military depots is depicted in Figure 5.

Figure 5: AI Digital Twin-Based Demand Forecasting:
Cloud Deployment

Source: Author's own.

The various components of the cloud deployment scenario above are explained as follows:

- **AI-Digital Twin Application Server (VM).** The AI Digital Twin server is hosted as a VM on the Army Cloud. The server runs a web application and has virtual storage for storing historical inventory data and trained machine learning models.
- **Project Management Team (PMT)**. The team ensures complete life cycle management support for the application.
- **Military Depots**. All military depots have secure access to the web application on the ADN. They use the application to periodically generate demand forecasts and update inventory data.

Recommendations

The recommendations for implementing AI-digital twin-based predictive maintenance and demand forecasting in the Indian Army are as follows:

> **The AI-digital twin will remain associated with the military equipment throughout its useful service life to facilitate its predictive maintenance. The AI digital twin will remain associated with the military equipment throughout its useful service life to facilitate its predictive maintenance.**

• All military equipment (embedded with sensors) must have a companion AI-digital twin created at the time of its induction into the service. The AI digital twin will remain associated with the military equipment throughout its useful service life to facilitate its predictive maintenance. The AI-digital twin should be erased after archiving its O&M data once the equipment is de-inducted from service. It is also proposed that the Indian Army adopt AI-driven demand forecasting for optimising inventory management in all military depots.

• A pilot project should be undertaken to validate the concept of AI-digital twins for facilitating predictive maintenance on selected military equipment. The project should aim to determine the impact of the proposed concept on the operational life of the equipment, including its downtime and availability, maintenance cost, requirement of specialised manpower, and training. Similarly, a pilot project should be undertaken to validate the concept of AI-driven demand forecasting in a designated military depot. The pilot project should aim to determine the impact of AI-driven demand forecasting in reducing occurrences of stockouts and overstocking of inventory items and in minimising forecasting errors compared to contemporary methods.

• Once tangible benefits are accrued from the pilot projects, the concept could be crystalised into developing and deploying enterprise-class cloud applications for adopting AI digital twins-based predictive maintenance and demand forecasting in the Indian Army.

Conclusion

The creation of AI-digital twins of military equipment (embedded with sensors) and military depots will be quintessential in adopting predictive maintenance and AI-driven demand forecasting in the Indian Army. AI digital twins of military equipment will facilitate the detection of equipment failures in advance, allowing corrective steps to be taken well before actual failures occur. This would result in reduced unplanned equipment downtime, increased equipment availability, lower maintenance costs, and optimal equipment utilisation. On the other hand, AI-driven demand forecasting in military depots would help reduce forecasting errors to make inventory management more efficient and cost-effective. The Indian Army should initiate pilot projects to test and validate the proposed concepts and adopt AI-digital twin-based predictive maintenance and demand forecasting to transform military logistics.

Notes

1. "What Is Digital Twin Technology And How Does It Work?", *TWI*, at https://www.twi-global.com/technical-knowledge/faqs/what-is-digital-twin#:~:text=A%20digital%20twin%20can%20be,to%20predict%20how%20they%20will. Accessed on November 25, 2023.

2. Zonta, *T. (2020). predictive-useful-life-based-into-telemetry.* Retrieved from www.kaggle.com: https://www.kaggle.com/datasets/tiagotgoz/predictive-useful-life-based-into-telemetry. Accessed November 20, 2023.

3. Based upon Christopher Cho, "Google Cloud launches Optimization AI: Cloud Fleet Routing API to help customers make route planning easier", April 15, 2022. Accessed on November 26, 2023 from google-cloud-optimization-ai-cloud-fleet-routing-api. Retrieved from cloud.google.com: https://cloud.google.com/blog/products/ai-machine-learning/google-cloud-optimization-ai-cloud-fleet-routing-api

Utility of Military Force in Achieving India's Strategic Objectives

DS Hooda

Abstract

Present-day conflicts present a dichotomy in the utility of military force in achieving strategic objectives. Since the end of the Cold War, decades of irregular wars over the globe suggested that conventional wars were passe. However, in the past two years, the wars in Ukraine and Gaza have brought out that prolonged conventional wars are very much possible even under a nuclear overhang. This article carries out a brief analysis of India's strategic objectives and the theoretical framework of war. It brings out the uncertainties like future wars, and how preparing for a perfect fit is impossible given the availability of resources. In this milieu using military force requires fresh but realistic thinking. When talking of Military Force for achieving strategic objectives all three Services come into play and have to be considered. This article in its first half looks at the overall Military Force and thereafter goes into the specific Army sphere. Here it gives some key recommendations to ensure as to how can India effectively manage and apply ground forces to meet the current and future conventional and asymmetric threats.

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Introduction

In the intricate tapestry of international relations and national security, the role of military force as an instrument to achieve strategic objectives is both pivotal and complex. For a nation like India, with its rich history and unique geopolitical challenges, understanding this role is not just about comprehending past and present military engagements but also about envisioning the future trajectory of its strategic planning. This article delves into the multifaceted utility of military force in shaping and achieving India's strategic objectives, offering insights into the theoretical underpinnings, historical contexts, and practical applications of military power.

Historically, India's strategic posture has been shaped by significant military engagements, from the post-independence wars to the more recent border skirmishes and counterinsurgency operations.

Historically, India's strategic posture has been shaped by significant military engagements, from the post-independence wars to the more recent border skirmishes and counterinsurgency operations. These events have not only tested the mettle of the Indian Armed Forces but also influenced the nation's approach to security and strategy.

Moreover, the role of military force in strategy is not static; it evolves with changing geopolitical dynamics, technological advancements, and the shifting contours of global power. Today's strategic environment demands a nuanced understanding of not just traditional warfare but also of emerging domains like cyber and space. India's journey towards modernising its military capabilities, including the push for indigenisation and innovation in defence technology, reflects an adaptation to these changes.

India's Strategic Objectives: An Overview

Understanding India's strategic objectives is critical to comprehending the utility of its military force. These objectives are multifaceted, influenced by historical legacies, geographical imperatives, and contemporary global dynamics.

Territorial Integrity and National Sovereignty

- Securing the disputed border with Pakistan and China remains a primary strategic objective. The long-standing Kashmir issue and recent skirmishes along the Line of Actual Control (LAC) with China underscore the need for a robust defence posture.
- With a vast coastline and strategic maritime routes, safeguarding India's maritime boundaries against piracy, terrorism, and strategic encroachments is crucial. The Indian Navy plays a significant role in protecting sea lanes vital for India's trade and energy security.
- Along with the Army and Navy, the Indian Air Force ensures the defence of national air space, air and space domain, contributing to the defence of national territory and defence of maritime areas.

Regional Stability and Power Projection

- India aims to maintain a position of influence in South Asia, managing relations with neighbours like Pakistan, Bangladesh, Myanmar, Nepal, Sri Lanka, and Bhutan. This involves a mix of diplomatic engagement and military readiness.
- Strengthening ties with Southeast Asian and East Asian nations as part of the 'Act East Policy'—both economically and strategically— to counterbalance China's influence in the region.

Global Positioning and International Relations

- Active participation in the United Nations and other international bodies to promote its strategic interests, including its long-standing

goal of becoming a permanent member of the UN Security Council.

- Building strategic partnerships with key global players like the United States, Russia, and European countries, balancing relations with China, and engaging with emerging economies in Africa and Latin America.

> **India wishes to grow economically and technologically to power the resources needed for the betterment of its people and to build a comprehensive security apparatus.**

Economic Growth and Security

- India wishes to grow economically and technologically to power the resources needed for the betterment of its people and to build a comprehensive security apparatus.
- Ensuring the security of energy supplies, particularly oil and gas imports, which are essential for India's growing economy.

Combating Terrorism and Insurgency

- Addressing internal security challenges, particularly in Jammu and Kashmir and the Northeast states, where insurgencies and terrorism have been long-standing issues.
- A significant aspect of India's strategic objective is to prevent and respond to terrorism emanating from across its borders.

India's strategic objectives reflect its aspirations to safeguard national interests, maintain regional stability, and assert its role on the global stage. Achieving these objectives requires a coordinated and collaborative effort across various institutions, encompassing both government and non-government entities. Each institution plays a specific role, contributing its unique capabilities and expertise to the collective goal.

The military's role in achieving strategic objectives is pivotal among the various institutions, requiring a balance between defence preparedness, diplomatic engagement, and economic development.

Utility of Military Force: A Theoretical Framework

The utility of military force in achieving strategic objectives has been a cornerstone of international relations and national security strategy. The debate about the utility of military force in the modern world is complex. In recent times, with militaries increasingly engaged in conflicts characterised by irregular warfare and complex socio-political dynamics, questions have been raised about the effectiveness of traditional military forces. On the other hand, the war in Ukraine has brought renewed attention to the relevance of conventional wars.

In his book "The Utility of Force: The Art of War in the Modern World," the author Rupert Smith argues that there is limited effectiveness of traditional military power in contemporary conflicts. Smith posits that the era of industrial warfare, characterised by state-on-state conflicts, has given way to "war amongst the people," where military engagements are often within states, involving non-state actors, and amidst civilian populations.[1] The utility of conventional military force in such scenarios is limited, as these conflicts demand more nuanced approaches, blending military, political, and humanitarian efforts.

In a similar vein, Mary Kaldor, in her book, "New and Old Wars," argues that in 'new wars', the lines between war, organised crime, and large-scale violations of human rights are blurred. These conflicts are rooted in identity politics and often financed through globalised networks, making traditional military responses less effective.[2]

In "The Limits of Power," Andrew Bacevich highlights the significant human and economic costs of military interventions, especially in protracted conflicts. He argues that reliance on military solutions often overlooks political, social, and economic dimensions, leading to unsustainable

outcomes.[3] Conversely, the ongoing conflict in Ukraine demonstrates the continuing relevance of conventional military force. The Ukrainian resistance, bolstered by military aid, has shown that conventional armed forces remain crucial in state defence against aggression. The conflict underscores the importance of a well-equipped and trained military in deterring aggression and defending sovereignty. Even if we assume that there is a reduction in the number of large-scale wars against nations, there are compelling justifications for retaining strong conventional forces grounded in strategic, political, and security considerations.

The Ukrainian resistance, bolstered by military aid, has shown that conventional armed forces remain crucial in state defence against aggression. The conflict underscores the importance of a well-equipped and trained military in deterring aggression and defending sovereignty.

In "Arms and Influence," Thomas Schelling argues that military force is a deterrent against potential aggressors.[4] The mere presence of a substantial military can dissuade adversaries from initiating conflict, thereby maintaining stability. In a world where threats are unpredictable, a credible military force acts as a powerful deterrent.

John J. Mearsheimer's theory of offensive realism, articulated in "The Tragedy of Great Power Politics," suggests that great powers are inherently cautious of each other due to the anarchic nature of the international system.[5] Maintaining substantial military capabilities is necessary for survival in a system where power dynamics can shift unexpectedly and potential threats can emerge rapidly.

Considering these arguments, it can be said that despite a decrease in traditional wars between nations, the continued maintenance of large military forces is justified by the need for deterrence and preparation for uncertain geopolitical shifts. However, military forces should be prepared

to play a multifaceted role that extends beyond the conventional battlefield, addressing non-traditional security threats, humanitarian interventions, disaster response, keeping pace with technological advancements in warfare, and contributing to national soft power.

Utility of Military Force in the Indian Context

The effectiveness and implications of using military power hinge on two fundamental principles: deterrence and compellence. Deterrence is about preventing an adversary from taking an undesirable action. It is based on the premise of a credible threat, where the cost of action for the adversary outweighs any potential gain. India's strategy against China is one of deterrence. India has primarily relied on its conventional military strength to deter China from military action through a robust deployment along the LAC, advantages of air operations over Tibet, and a dominant naval position in the Indian Ocean.

India's development of nuclear weapons can also be viewed through this lens. The overt nuclearisation in 1998, demonstrated by the Pokhran-II tests, was a strategic move to deter both regional adversaries and project power on a global scale. India's nuclear doctrine, which includes a no-first-use policy and a focus on a credible minimum deterrent, reflects a strategic posture aimed not at aggression but at ensuring territorial integrity and preventing external coercion.

Compellence, on the other hand, involves forcing an adversary to take a specific action. It's more direct and often involves active military engagement. The Indian military's role in the 1971 Bangladesh Liberation War is an example of compellence. India's military intervention, which was pivotal in the creation of Bangladesh, was a strategic move that altered the geopolitical landscape of South Asia. This intervention illustrates how military force can be used to compel a change in the status quo, aligning with national strategic objectives. Recent cross-border actions by India in

2016 and 2019 can also be seen as forms of compellence to bring about a change in Pakistan's strategy of using terrorism as a tool against India. As long as Pakistan's behaviour does not undergo a change, India will continue to use sub-conventional tools to pressurise Pakistan.

Viewed in a historical context, Indian military forces must be prepared for a broad spectrum of military activities, from surgical operations to limited wars to full-scale conflicts. India has engaged in all these types of conflicts since independence and has the capability and experience to undertake such military operations.

Moreover, the counterinsurgency operations in Jammu and Kashmir and parts of Northeast India showcase a different dimension of the military's role in achieving strategic objectives. These operations are not about outright warfare but about maintaining sovereignty, ensuring internal security, and managing asymmetric threats. The Indian Army's role in these regions underscores the complexity of using military force, where the lines between combat and non-combat scenarios are often blurred.

In understanding the utility of military force, it's also essential to consider the evolving character of warfare. Cyber warfare, space capabilities, and unmanned systems are reshaping the strategic landscape. India's push towards modernisation and adaptation, including the establishment of the Defence Cyber Agency and the Defence Space Agency, reflects an understanding of these changing dynamics.

One can say that the utility of military force in achieving strategic objectives is multifaceted. It involves a mix of deterrence, compellence, and adapting to the changing character of warfare. Historical examples from India's military engagements provide tangible insights into how these concepts are applied in practice. As global dynamics evolve, so will the strategies that govern the use of military force, requiring continuous adaptation and reassessment.

> **The effective application of military force is contingent upon a multitude of factors that span strategic planning, operational execution, technological capabilities, and broader political considerations.**

Indian Army: Adapting for Conventional and Asymmetric Threats

The effective application of military force is contingent upon a multitude of factors that span strategic planning, operational execution, technological capabilities, and broader political considerations. The utility of military force in this context is not merely a matter of deploying troops or showcasing military might; it's about how effectively this force is integrated into the broader framework of India's strategic vision. This is explained in the succeeding paragraphs.

Clear and Achievable Objectives and Civil-Military Synergy

Military force should be used with clear, well-defined, and achievable objectives. Ambiguity in goals can lead to mission creep, inefficiency, and prolonged conflicts. Military objectives must also align with broader political goals. The disconnect between political aims and military objectives can undermine the overall effectiveness of military action.

The current national security decision-making architecture has no military advisor to the National Security Council and the Cabinet Committee on Security. It is suggested that the role of the Chief of Defence Staff be revised to become the Principal Military Advisor to both these bodies, in addition to the Raksha Mantri.

For internal conflicts like Jammu and Kashmir and the Northeast, where the army is actively involved, there is a need for a comprehensive politico-military strategy that will lead to a lasting resolution. There is little joint planning in the Ministries of Home Affairs and Defence, often resulting in the army saying that their job is limited to controlling

violence levels, while steps for final resolution are the responsibility of the political leadership. The political leadership certainly has the final say, but as mentioned earlier, military actions must align with political goals and cannot be conducted in isolation.

With the LAC heating up considerably since 2020, the management of the northern borders needs a review. The current arrangement of two forces—the army and the Indo-Tibetan Border Police—deployed along the LAC and reporting to two different ministries goes against the very principle of "One Border, One Force" espoused by the government. The Indian Army should be in complete control of the LAC.

Formulating an Indian Army Doctrine

Considering the variety of challenges facing the Indian Army, there is a need to prepare a fresh doctrine that provides a fundamental set of principles and strategies that guide the Army in its operations. The doctrine will establish a common intellectual framework that helps members of the army understand their roles and the nature of their operations. It will ensure consistency in approach and decision-making across different levels of command.

The doctrine will provide the basis for developing specific strategies and tactics. It will assist in planning how to employ forces effectively in various scenarios, considering potential adversaries and the nature of the battlefield. It will also shape the training regimes and preparedness, determining essential skills and knowledge and how soldiers should be trained to face current and future threats.

In framing the military doctrine, the following aspects must be kept in view:

- The doctrine should align with India's broader national security objectives and foreign policy goals. It must support the overall strategic interests and values of the nation.

The issues of force structure and technology have to be seen together because there is often a debate on boots on the ground vs. technology. This debate reflects the evolving nature of military strategy and the complex requirements of modern conflicts.

- It should be based on a realistic assessment of current and potential future threats. This includes understanding the capabilities and strategies of potential adversaries.

- The doctrine must consider the impact of technological advancements on warfare. This includes cyber warfare, unmanned systems, artificial intelligence, and other emerging technologies.

- The doctrine should address both conventional warfare against state actors and asymmetric warfare, which includes counterterrorism and counterinsurgency operations.

- With the increasing importance of joint and combined operations, the doctrine should facilitate integration and interoperability.

- The development of doctrine should involve a diverse range of perspectives, including military leaders, strategists, technologists, and academics, to ensure a comprehensive and forward-looking framework.

Force Structure and Technology

The issues of force structure and technology have to be seen together because there is often a debate on boots on the ground vs. technology. This debate reflects the evolving nature of military strategy and the complex requirements of modern conflicts. Boots on the ground and technology are not mutually exclusive but rather complementary. Ground forces are crucial for holding territory along the disputed borders, interacting with local populations, and conducting operations where a physical presence is indispensable. However, technology enhances the capabilities of these forces and can often reduce the need for large deployments.

The relevance of either approach depends on the nature of the conflict. In conventional state-to-state warfare, technology plays a critical role in gaining superiority. In counterinsurgency operations, the presence of ground troops can be more effective in establishing control and building trust among local populations. The Indian Army faces both types of challenges.

While technology offers significant advantages, it is not infallible. Adversaries can develop countermeasures, and technologies can fail or be limited in specific environments. Ground forces provide a level of resilience and adaptability that technology alone cannot. The use of technology, especially autonomous weapons and drones, raises ethical questions. Being more discernible, humans offer more transparent lines of responsibility. Thus, a hybrid approach that effectively integrates technology with boots on the ground will be the most effective strategy. The Indian Army must study this with an open mind. The current force structures are largely a World War II legacy and need to be reorganised with greater technology adoption, leading to leaner units. The army no longer has the luxury to continue with current force levels where revenue costs prevent significant modernisation.

Internal Security Role

The Indian Army has continuously been deployed in an internal security role since independence. Today, it is combating insurgency and terrorism in the Northeast and Jammu and Kashmir. There has been a significant drawdown of the army from the Northeast, but large forces are still deployed in Jammu and Kashmir.

There were some reports in early 2023 that the Union government was considering a proposal to withdraw the Indian Army completely from the hinterland, with a presence only on the Line of Control (LoC).[6] The proposal seems to have been put on the back burner after an increase in violence in the Jammu region, but a long-term view needs to be taken.

There could be some reservations about drawing down the RR force, India's most experienced counterterrorism force for Jammu and Kashmir. However, some hard decisions need to be taken on how the Indian Army should be structured and equipped for its future challenges.

The army is facing manpower pressures, exacerbated by the enhanced deployment of troops along the LAC to handle the crisis that erupted in 2020 in Eastern Ladakh. Drawing down on internal security duties would allow the army to right-size its force structure. The army is already thinking along these lines, considering reducing the Rashtriya Rifles (RR) companies in a unit from six to four and disbanding some of the sector and force headquarters.

The first step should be a comprehensive and level-headed discussion between the Home and Defence ministries on the security situation in Jammu and Kashmir. If circumstances are favourable, the army could hand over internal security duties to the Central Reserve Police Force (CRPF) in a phased manner. The start could be made in the Jammu region, where the CRPF takes over the complete responsibility for counterterrorism operations. A few RR units could be kept as a reserve for any contingency that may arise. After the stabilisation of the CRPF deployment in the Jammu region, the second phase could be the handover of the Kashmir hinterland to the CRPF, with the bulk of RR units being disbanded, except for a few that could act as reserves.

There could be some reservations about drawing down the RR force, India's most experienced counterterrorism force for Jammu and Kashmir. However, some hard decisions need to be taken on how the Indian Army should be structured and equipped for its future challenges. The terrorist incident upsurge South of the Pir Panjal in 2023 should be seen as something which can justify delaying this drawing down,

but not as something which should postpone it indefinitely. To retain its counterterrorism expertise, the army must look at strengthening and expanding the capabilities of its Special Forces. Reducing internal security duties does not mean the army focuses purely on conventional warfighting. Future wars will be hybrid in nature, a multifaceted conflict that combines traditional military tactics with irregular

The military strategy for fighting in the information domain should be dynamic, adaptable, and forward-looking, recognising the rapidly evolving nature of technology and the information landscape.

methods, such as cyber-attacks, misinformation, and proxy forces. Army forces will have to be suitably structured to meet these threats.

Information Operations

Information operations (IO) are increasingly recognised as a critical element in future wars, given the growing importance of information and communication technologies in both civilian and military realms. The US Department of Defense defines the information environment as the "aggregate of social, cultural, linguistic, psychological, technical, and physical factors that affect how humans and automated systems derive meaning from, act upon, and are impacted by information, including the individuals, organisations, and systems that collect, process, disseminate or use information."

The military strategy for fighting in the information domain should be dynamic, adaptable, and forward-looking, recognising the rapidly evolving nature of technology and the information landscape. It should be an integral part of overall military planning, reflecting the increasing importance of the information domain in modern warfare.

To develop robust capabilities in information operations, the Indian Army must undertake the following measures:

- Formulate doctrines specific to information operations that outline strategic approaches, tactics, and rules of engagement. This must lead to strategies that integrate information operations with traditional kinetic military actions to enhance overall operational effectiveness.
- Identify and understand the target audiences, including adversary forces, local populations, and the international community. Craft clear and persuasive messages to influence the perceptions and behaviours of target audiences, supporting overall military objectives.
- Develop capabilities for conducting cyber-attacks to disrupt, degrade, or destroy adversary information systems and networks. Strengthen cybersecurity measures to protect military infrastructure from cyber threats.
- Build robust IT infrastructure that supports advanced data analytics, secure communication, and network operations. Indigenous solutions must replace foreign hardware and software in the infrastructure.
- Invest in technologies and methodologies for advanced intelligence gathering, including signals intelligence (SIGINT), human intelligence (HUMINT), geospatial intelligence (GEOINT), and open-source intelligence (OSINT).
- Consider creating specialised units for information operations, including cyber warfare, electronic warfare, and psychological operations. Foster cross-domain expertise in these units to integrate information operations with conventional military capabilities.

Conclusion

In synthesising the intricate relationship between military force and India's strategic objectives, it becomes evident that the country's approach to national security is as dynamic as it is deliberate. India's history, geographic realities, economic ambitions, and evolving global security milieu necessitate a military force that is robust, ready and reflective of the nation's strategic vision.

The historical tapestry of India's military engagements, from post-independence wars to present-day border conflicts and counterinsurgency operations, highlights a trajectory of growth and adaptation. The evolution of India's military doctrine, particularly in response to its nuclear policy and the challenges of conventional and asymmetric warfare, reveals an astute understanding of the strategic calculus required to navigate an increasingly complex global arena. It must now show similar adaptability to the emerging character of warfare.

In an era marked by complex security challenges, India's strategic objectives necessitate a military force that is versatile, technologically advanced, and strategically aligned with national goals. In achieving this aim, the development of a comprehensive Indian Army Doctrine responsive to both traditional and asymmetric threats is crucial. This doctrine must be grounded in the realities of modern warfare, including the pivotal role of information operations. Balancing 'boots on the ground' with cutting-edge technology, the Indian Army must be equipped to confront the spectrum of potential conflicts, from border skirmishes to cyber threats. As India positions itself on the global stage, its military prowess, underpinned by strategic foresight and innovative doctrine, will be instrumental in securing its sovereignty and regional stability.

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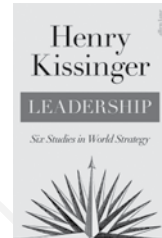
Book Reviews

Govind Nelika

> *“Leaders think and act at the intersection of two axes: the first, between the past and the future; the second, between the abiding values and aspirations of those they lead.”*
>
> Henry Kissinger

Introduction

‘Leadership: Six Studies in World Strategy’ is a book authored by Henry Alfred Kissinger, a renowned diplomat and strategist known for his tenure as the Secretary of State and National Security Advisor during the presidency of Richard Nixon and Gerald Ford. Kissinger played a pivotal role in shaping U.S. foreign policy at a critical time. He played a leading role in opening relations with China and in shaping foreign policy which utilised a détente approach towards the Soviet Union. During the Cold War era, he was an integral negotiator in the Paris Peace Accords, which aimed to end the Vietnam War. His efforts earned him a Nobel Peace Prize.

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Introducing the Leader

The author in the first section of the book gives a clear outline of the notion of leadership, how dynamic a leader must be, how effectively he must calculate probabilities of the coming future and learn from the past. He writes that the leader possesses attributes such as willingness to do what is necessary, and the strength of character and courage to see it through. The author compares a leader's chosen path to "traversing a tightrope", similar to an acrobat, as leaders will fall if they are far too timid or too audacious. The author warns excessive hubris of leaders to result in their exhaustion, while relying on past achievements will lead to decay. In the subsequent sections, the author looks like the account of six global leaders, all of whom learned from World War I and II or, the second thirty-year-old war. The author details what a leader is and the types of leaders. For this he quotes from history and classifies leaders into two categories: Statesmen and Prophets.

Konrad Adenauer: The Strategy of Humility

The chapter delves into Konrad Adenauer's remarkable journey from Cologne's mayor to post-Hitler Germany's first Chancellor. Adenauer's approach focuses on four key elements: accepting the consequences of defeat, regaining the victors' trust, building democracy, and fostering a unified European entity. It chronicles Adenauer's path, highlighting his commitment to nationalistic and Christian principles throughout Germany's revival. The Author adeptly details Adenauer's journey, culminating in lifting Germany from post-war partition, to gaining freedom from occupation and recognising the imperative of "moral and material reparations" for the Holocaust.

The words of Angela Merkel describe Adenauer's legacy on the fiftieth anniversary of his death.

> *"Today, we honour a great statesman who, with foresight and skill, gave our country perspective and stability after the failure of the Weimar*

Republic and the horrors of National Socialism. We bow to Konrad Adenauer with great gratitude. We consider his merit an obligation for our tasks in a confusing, difficult world. Given what Konrad Adenauer and his contemporaries have achieved, we should have the courage to continue this work."

Charles de Gaulle: The Strategy of Will

The author starts with De Gaulle's pivotal role in resurrecting France after World War II. He underscores his resolute commitment to revitalising France's prominence on the international stage and his transformative role in rebuilding post-war France to its strategic prowess in international affairs. De Gaulle's Leadership is portrayed as a blend of visionary ideals and methodical implementation. Additionally, the content delves into the distinct nature of de Gaulle's statesmanship, comparing it to Churchill's. Ultimately, the chapter concludes with de Gaulle's passing in 1970, depicted as a reflective moment in French history. The author brings out de Gaulle's enduring impact and the enigmatic aura that encapsulated his historical significance in the global arena. The last part highlights his deeply cherished relationship with his disabled daughter, Anne, as described by De Gaulle himself when he said:

"Without Anne, maybe I never would have done what I did. She gave me the heart and the inspiration."

Richard Nixon: The Strategy of Equilibrium

The author explains Nixon's foreign policy and his leadership amid complex geopolitics. His key principle is considering national interest as the defining objective in the pursuit of strategy and foreign policy. His tactics and global strategy showcased a "Nixonian flexibility".

Today, Nixon's approach remains relevant, emphasising strategic priorities, alliances, and shared legitimacy. Despite tarnishing his legacy

by events of the Watergate scandal, Nixon underscores the importance of adept diplomacy and strategic adaptation in addressing contemporary global challenges. The essence of Nixon's diplomacy lay in his disciplined application of American power and national purpose after it had been on the verge of being consumed by domestic controversies.

Anwar Sadat: The Strategy of Transcendence

"The Strategy of Transcendence" comprehensively analyses Anwar Sadat's instrumental role in securing the 1979 Egypt-Israel Peace Treaty. It traces Sadat's journey from the 1952 revolution to his pursuit of peace and meticulously traces Sadat's life and presidency, including his historic visit to Jerusalem and negotiations at Camp David. The chapter aptly explores the intricate dynamics of Arab Israeli relations, external influences, and societal factors. Its well-structured narrative maintains a balanced perspective, providing a valuable resource for understanding the complexities of achieving peace in a turbulent Middle East. One could state that the section on the Tortuous Road to Peace on the challenges faced is quite aptly described. The chapter also showcases Anwar Sadat's thoughts through his quote:

> *"We will be judged not by the hard positions we took but by the wounds we heal, the souls we saved, and the suffering we eliminated."*

Lee Kuan Yew: The Strategy of Excellence

The chapter details the Journey of Lee Kuan Yew, the founding father and first Prime Minister of Singapore, elevating Singapore from a disease-ridden slum into a first-world metropolis. The chapter details Lee Kuan Yew's approach to harmonising a country containing people from different cultural backgrounds, his rejection of rigid ideologies, and his focus on creating a pragmatic and competent government. His approach left a lasting impression on Singapore, even more so through his expert

engagement with the USA and China, where Lee could balance the relationship while furthering Singapore's national interest. The passage concludes by reflecting on the relevance of Lee's statesmanship in today's complex world order and the lessons his life offers for fostering progress, coexistence, and navigating a global world order. The chapter also describes Lee Kuan's character and unwavering commitment to his wife and family besides his country. The following quote by Lee Kuan Yew in the chapter encapsulates his approach towards community, showcasing his visionary mindset.

> *"And finally, let us, really Singaporeans—I cannot call myself a Malaysian now—we unite, regardless of race, language, religion, culture."*

Margaret Thatcher: The Strategy of Conviction

The part of the book deals with the leadership and legacy of Margaret Thatcher—dubbed the "Iron Lady"—the iconic Prime Minister of the United Kingdom., The chapter highlights her conservative principles and nature apart from her resolve to reverse Britain's economic decline in the late 1970s by opting for a liberal market, her complex relationship with the European Union, internal party conflicts, and eventual resignation in 1990. In the chapter, the authors attribute Thatcher's strength and Achilles' heel to her unwavering convictions or her notion of never yielding, leading to her fall from power due to European disputes and the poll tax. Her legacy includes reshaping the UK's economy, her stance on Europe, and her influence during the Cold War, making her a significant figure in British history. The author emphasises Thatcher's vision for a decentralised, pro-market European Union in the chapter.

The very last hymn to be sung at her funeral service in St Paul's Cathedral on April 17, 2013, captured her outlook:

"I vow to thee, my country, all earthly things above, Entire and whole and perfect, the service of my love: The love that asks no question, the love that stands the test, that lays upon the altar the dearest and the best."

The Evolution of Leadership

In the concluding chapter, the author retrospect's the effective leadership of the post World War II era, drawing insights from the experiences of six prominent twentieth-century leaders: Adenauer, de Gaulle, Nixon, Sadat, Lee Kuan Yew and Thatcher. It poses critical questions about the presence of essential qualities in today's leaders, primarily focusing on their capacity for long-term policy planning and authentic leadership. In an ever-changing landscape of today the world has changed mainly in terms of standards, culture, traditions, and morals. The last standard has drastically changed globally. The legacy these leaders left behind has had a profound impact on the nature of their countries and in some manner, the world.

Which leader will scale the heights of being a true visionary and motivator is unpredictable. The nature of leadership is such that leaders often emerge from obscurity when confronted with significant challenges. Machiavellian observation of society and Max Weber's criteria for transformational Leadership, emphasise the necessity for leaders who can maintain their vision and determination despite facing obstacles and scepticism. The six profiled leaders share common attributes, including a profound comprehension of their societies' circumstances, an aptitude for formulating strategies for the present and future, adeptness in motivating their societies toward loftier objectives, and an unwavering commitment to addressing deficiencies.

The conclusion of the book is that leadership results from the interplay between inherent and nurtured qualities. Leaders play a pivotal role in guiding their societies' responses to challenges, inspiring public service,

and fostering a spirit of sacrifice. The author underscores the ongoing relevance of character-driven leadership in a complex and evolving world by the following lines:

> *"We live in a time when leaders are often judged more by the stridency of their rhetoric and the coloration of their politics than by the success of their policies. Especially in the developing world, too many people have gone to bed at night with their ears full but their stomachs empty."*

The above quote serves as a poignant reflection on the current state of global leadership. It entails the author's perspective, rooted in the aftermath of World Wars I and II, where some leaders rose to the occasion, leaving an indelible mark on history, while others laid the groundwork for the prosperity their nations enjoy today.

Conclusion

Herny Kissinger died at the age of 100 years and six months in November 2023. As we navigate the landscape of 2023, the author's insights gain prominence, particularly in the context of shifting political dynamics. The once-dominant Western-centric global autonomy has given way to a more inclusive global order, where the Global South will play a pivotal role. The contemporary generation of leaders bear the weight of influencing the rise and fall of nations in an era marked by proxy wars.

The recent events coming up to 2023 have witnessed America's withdrawal from Afghanistan and the ongoing conflicts of Russia-Ukraine and Israel-Hamas; the instances will serve as tangible indicators of how future generations will assess today's leaders. The pivotal question revolves around the extent of change, prosperity, or downfall that these leaders may usher in, emphasising the urgency of international cooperation.

The Author's exploration of six extraordinary leaders—or better said, visionaries—adds depth to the narrative, acknowledging that

their impact is a subject of both celebration and critique by the current generation. In a stark contrast reflecting the global shift in power politics, today's leaders will often be reminded that people have grown tired of ineffective policies and promises. The criterion for judgment extends beyond notions of caste, creed, gender, or race; the spotlight is on tangible outcomes.

Romance of the Three Kingdoms
Luo Guanzhong
Penguin Classics: London, 2018, pp. 672, Rs 1140
(Paperback), Rs 256 (Kindle)
ISBN: 978-0241332771

Shushant VC Parashar

China has a rich history spanning four to five thousand years. Despite periods of instability and internal warfare, stories and myths from the people have inspired well-known works like this book which was first published in 1522 AD. It has been translated into English and many other languages. It is attributed to Luo Guanzhong and is in the genre of historical fiction. The Romance of the Three Kingdoms is set during the last years of the Han dynasty and the turmoil between warlords that followed, resulting in the division of China into three states. The book is known for its unique blend and is considered a masterpiece due to its unforgettable characters, epic battles, and enduring impact on Chinese society.

In 168 AD, the Han dynasty was ruled by corrupt eunuchs, causing famine. In 184 AD, a Daoist cult led an uprising called the Yellow Turban Rebellion. Warlords grew more robust, and central power weakened. In 190 AD, warlords formed a coalition to overthrow the cruel warlord Dong Zhuo and save the puppet emperor. This led to a period from 190 AD to 220 AD of warlords fighting for power and lands, with epic battles, duels, intrigues, and love stories.

In 220 AD, Cao Pi declared himself Emperor of Wei after his father's death, ending the Han dynasty. Sun Quan then proclaimed

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himself Emperor of Wu, and Liu Bei declared himself emperor of the restorationist Shu-Han dynasty, kickstarting the Three Kingdoms period. After a balance period, all three kingdoms suffered from incompetence and corruption. Sima Yi and his sons usurped the Wei throne and created the Kingdom of Jin, conquering Shu-Han and Wu, reuniting China under the Jin dynasty by 280 AD.

The Romance of the Three Kingdoms features over a thousand named characters, including Sun Quan of Wu—embodying filial piety and the Confucian dilemma between righteousness and legitimacy. Brotherhood is another central theme in the novel, with Liu Bei, Guan Yu, and Zhang Fei swearing an oath to protect the empire at all costs.

The essence of the novel is the power balancing between the three kingdoms which arise from the fragmentation of the previous large unified kingdom of China ruled by the Han dynasty. The novel has heavily influenced Chinese leadership through the ages, and many have stated the influence of the work on their policies. Mao Zedong, who was deeply influenced by the book, used it to exalt his soldiers. One character in the book, the genius Zhuge Liang devises a brilliant plan to give a weaker faction—the Liu Bei—the final victory. Mao used such stratagems during the Cold War period and even subsequently Mao's successors managed to maintain the balance between the other two superpowers, as Mao's idea even outlived him.

Chinese President Xi Jinping has in speeches throughout his career referred to the Three Kingdoms while addressing or exhorting the Chinese people.

The Wu kingdom led by Sun Quan aimed only for regional hegemony, which it fiercely defended at the Battle of Chibi. This kingdom had no design to dominate the world. Today, China aims to be the regional hegemon of Asia, using military strategies and forging partnerships with countries like Russia to counter the influence of the US.

The Wei Kingdom in the Three Kingdoms represents tyranny. It was led by the ruthless Cao Cao, who used alliances to subjugate neighbouring states but broke his word if it suited him. Similarly, China uses economic influence to coerce weaker states, demanding natural resources.

The Shu Kingdom embodies the humane authority led by Emperor Liu Bei, a virtuous and benevolent man who had a circle of faithful strategic advisors. China's international engagement includes the One Belt One Road project, which links China with Central Asia, Europe, and South Asia. In Chinese perception, the One Belt One Road project is benevolent, contrary to what the world perceives.

China's international behaviour can be studied using the Three Kingdoms framework. In modern times, China has displayed characteristics of each kingdom. While it aims to be a wise and humane authority like Liu Bei, its coercive economic policies towards its neighbours are like of the tyrant Cao Cao. Additionally, its attempts to exert regional leadership are aligned with Sun Quan's desire to be a regional hegemon. The Three Kingdoms analogy can help us understand China's actions within its culture and history. Analysing it can provide insights into China's future behaviour and ambitions within the world order.

A timeless classic like many other epics of various cultures it is a must-read for students of Chinese strategic thinking.

Notes for Contributors

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Abbreviations:
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(e) Articles in Newsmagazines: Gurmeet Kanwal, "Pakistan: On the Brink," *The Week*, November 4, 2007, p. 45.

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(j) Unpublished Theses and Dissertations:
Christopher Strawn, "Falling of the Mountain: A Political History and Analysis of Bhutan, the Bhutanese Refugees and the Movement in Exile", Dissertation submitted to the University of Wisconsin, USA, 1993, Chap. 4.

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