SCHOLAR WARRIOR

CENTRE FOR LAND WARFARE STUDIES

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CENTRE FOR LAND WARFARE STUDIES
New Delhi

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Mailing address
Editor, SCHOLAR WARRIOR
Centre for Land Warfare Studies
RPSO Complex, Parade Road
New Delhi 110010, India.
Tele: +91-11-25691308, Fax: +91-11-25692347
Email: landwarfare@gmail.com /
claws.publications@gmail.com
Website: http://www.claws.in
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From the Desk of the Editor

The standoff with China in Ladakh and a 'bloody nose' to the PLA in June 2020 is testimony to the valour and bravery of our soldiers who are a creed apart. The battle-hardened soldiers are at home in all types of terrain; be it's deserted, to the jungles of northeast or the icy heights of Galwan Valley. Indian Army's tough stand has forced PLA to disengage and Corps Commander level meetings are taking place to move towards the status quo of earlier times. Banning of Chinese apps by the government and cancellation of contracts has had a worldwide ripple effect and other nations have followed forcing China to bear the wrath of nations post COVID-19. The changing world order and new alliances or groupings form the theme of two articles in the National Security, Land Warfare and Strategy Section. The challenges and payoffs of employment of armour in restrictive terrain and modernisation efforts of the Indian Army forms the balance of the first section. The second section on Regional Neighbourhood focusses on Chinese aggression and India's response strategy, confronting Chinese mechanised forces in case of any PLA intrusions, understanding the Military-Jihadi Complex in Pakistan and ways to neutralise their impact and the last article tackles India's energy security and need to develop sufficient reserves.

The third section dwells on Military Technology and War Systems. Here, the focus is on emerging artificial intelligence and its application in our context, followed by the emergence and the impact of NavIC on precision targeting by artillery on strategic and tactical levels. The next two articles discuss change management in armed forces for technology absorption and a relationship between firepower and technology. The fourth section dwells in Military History and here we cover reminiscences of our former CAOS on terrorism in Kashmir Valley besides paying homage to the braveheart, 2Lt Rakesh Singh, Ashok Chakra (Posthumous). The last section covers two articles on understanding the 'Centre of Gravity' and the impact of biological warfare and bio-terrorism. The three

book reviews form an interesting study of Chinese asymmetric warfare thought process, prediction of Chinese actions written a decade earlier and the CPEC impact.

We solicit details of unit-level actions and acts of valour of our soldiers which, at times, miss out the limelight due to unforeseen constraints. The acts of valour of all our heroes need to be highlighted and we will be happy to publish these. This edition of SW is balanced, insightful, and all-encompassing.

Happy Reading !!

Col **Ashwani Gupta**
Editor

CENTRE FOR LAND WARFARE STUDIES (CLAWS)

RPSO Complex, Parade Road, Delhi Cantt, New Delhi-110010
Tel: 9311950042, Fax: 91-11-25692347
Email: landwarfare@gmail.com, director.claws@gmail.com,
Web: http://claws.in

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SCHOLAR WARRIOR

SECTION I

NATIONAL SECURITY, LAND WARFARE AND STRATEGY

CENTRE FOR LAND WARFARE STUDIES

Does Credibility Matter in International Politics?

HARSHA KAKAR

Introduction

The Coronavirus traces its likely origin in bats and the first human transmission in Wuhan, China, in mid-November. Subsequently, it spread globally and brought China and the WHO in open confrontation with the rest of the globe. Nations demanded an investigation into the origin of the virus, its subsequent global spread, with little impact on the rest of China as also the role of the WHO, toeing the Beijing line. China, which till mid-February was the recipient of global aid as it battled the crisis, faced backlash for its role in handling the pandemic. It began defending itself vigorously against all accusations, even spinning yarns on the origin of the virus.

The virus brought forth lessons, which were known for decades but were ignored. Economy and diplomacy, which were always considered to be linked, began separating. Nations that dominated global politics and decision making moved into the background opening doors for others. Allies and coalitions, which had survived multiple crisis, ended up in growing mistrust. Global cohesion in controlling a pandemic was invisible leaving doors for exploiting those in need. In short, the Coronavirus has impacted the global community in many more ways than the two world wars and the financial crisis of the last decade.

Chinese Offensive Approach and Global Distancing

China's move to replace USA as the global dominant power by taking advantage of Covid-19 epidemic has backfired.

Nations began questioning China and called for inquiry. China believed in its invincible power and responded in full vigour. Its diplomats commenced threatening host nations leading to alienation. In Sri Lanka, the twitter account of the Chinese Ambassador was suspended for inflammatory comments. The Chinese ambassador to Cyprus, faced flak for stating that the world was embarrassed on how quickly China recovered and has hence resorted to 'blame shifting and lies.' In Brazil, the Chinese Embassy had a spat with a Brazilian minister on his comment of China's plan for world domination. In addition, with Brazilians supporting Taiwan, there were further disagreements when the Chinese Ambassador, warned the Brazilian leadership of the 'One China' policy. In some nations, like France, comments were undiplomatic and hurt local sentiments, leading to the Chinese Ambassador being summoned.

In Europe, where China was seeking to replace the US, the 'wolf warrior' policies of its diplomats has, on the contrary, led to China losing ground and friends. In an opinion piece in Bloomberg on 7 May, Andreas Kluth writes, '2020 may go down in history as the moment they (Europeans) turned against China in defiance … It's because China, by trying to capitalize on the pandemic with a stunningly unsophisticated propaganda campaign, inadvertently showed Europeans its cynicism.' He added, 'Chinese officials have managed to offend Europeans across the continent, who usually agree on nothing.'

An article also appeared in the Chinese government owned website Sohu.com titled, 'Why Kazakhstan is eager to return to China.' It angered the government of Kazakhstan which called in the Chinese Ambassador to protest. In response the Chinese stated, 'The article does not reflect the position of China's government.' The article was subsequently withdrawn.

When Australia and New Zealand joined calls for an investigation, China responded with economic threats and inflammatory comments. It initially accused them of joining an 'anti-China crusade' with the US to 'smear China.' It also termed Australia as 'the most loyal US attack dog.' It sought to target Australia. China began imposing tariff on Australian barley, rejected its beef stocks on flimsy grounds and refused to import Australian iron ore. It advised its citizens to avoid visiting or studying in Australia, claiming biases against

Asians. The Chinese ambassador, Cheng Jingye, stated that Chinese tourists and students may rethink their plans to visit Australia in the future and consumers may decide against buying Australian products.

In an article, dated 1 May, in the *Sydney Morning Herald*, Peter Hartcher, an Australian journalist and commentator wrote, 'Australia has arrived at its moment of truth. It is now presented with the explicit choice between sovereignty and money. It arrived this week when the Chinese Communist Party publicly threatened Australia with trade boycotts for proposing an international inquiry into the global pandemic.' Australia has refused to budge from its stand, choosing principles to trade. It has stuck to it. Australian Prime Minister, Scott Morrison, stated, 'We are an open trading nation, but I am not going to trade our values in response to coercion from wherever it comes.'

Trump announced that the G7 was an outdated concept, hence the grouping needed to expand and add developing economies, including India, South Korea, Australia and Russia. All the nations accepted the offer, except Russia, which desired the participation of China. China has viewed this grouping as being against it. *The Global Times* commented on 5 June, 'if India hastily joins a small circle that perceives China as an imaginary enemy, China-India relations will deteriorate. This is not in India's interests. The current bilateral relations have already been on a downward trend.'

Simultaneously, China began flexing its muscles in the South China Sea. Its offensive naval manoeuvres directed towards Vietnam, Philippines, Malaysia and Japan have led to increased tensions in the region. With the second swearing in of the anti-China government in Taiwan, Xi Jinping began threatening it with military action. In an editorial of 13 May, *The Global Times* stated, 'the US has no capability to protect Taiwan once the separatists cross the red line, since the mainland now has the overwhelming advantage to solve this long-standing problem.' To counter China, the US has moved three aircraft carrier led groups into the Indo-Pacific. North Korea, a Chinese dependent state, has broken off all communication channels with South Korea and worsened the tensions in the region.

There has been a continuing standoff between China and India in Ladakh. As per reports the Indian army is preparing for a hostile summer expecting more Chinese action. While there has been some disengagement, post multiple rounds of military talks, the Pangong Tso standoff continues. It may continue till a diplomatic solution is found. India has refused to either bend or stop construction of its infrastructure along the borders. Multiple reasons have been

stated on why China commenced the standoff, especially in regions where such incidents are rare, including the Galwan Valley, however the reality is unknown.

An article in *The Global Times* on 26 May, authored by Long Xingchun, President of Chengdu Institute of World Affairs states, 'Although a handful of Indian media outlets and social organizations echo the Trump administration's views, the Indian government should keep a sober head to not be used as cannon ash by the US.' In addition, China has cautioned India against taking advantage of the ongoing US-China trade war. Evidently, it is also irked by Indo-US proximity. An article of 8 June stated, 'due to the complexity of the situation, the military standoff could continue for a little longer,' while going on to mention a peaceful resolution to the standoffs.

The Chinese navy is bound to increase its actions in the Indian Ocean, stretching the capabilities of the Indian navy and adding to concerns. Threats continue to flow through the Chinese Global Times. Their editorial published on 18 May, stated, 'Since the outbreak of COVID-19, there have been some subtle and complex changes in China-India relations, which have created uncertainties for the improvement of bilateral relations.' It also stated, 'if India escalates the friction, the Indian military force could pay a heavy price.' Recent objections by Nepal for the first time in years, on a road constructed within Indian territory, away from the disputed Kalapani area, were due to Chinese instigations. China recently sent a medical team to Bangladesh, to assist it in battling the Coronavirus. China is seeking to win over Indian neighbours in South Asia hoping to enhance pressure on India for its own gains, hoping to pull India away from the US with military threats.

China's rude, offensive and threatening behaviour globally, has begun pushing it away from global groupings. It is losing allies and friends at an unbelievable pace. It considers itself capable of fighting global anger single-handedly on account of its economic and military power, but in the bargain has lost international faith and credibility. Realistically, China has just a few friends left. Pakistan and North Korea are sworn allies, who neither possess a choice nor a voice in global circles. The only major country on China's side is Russia, which would back China as it seeks to counter US influence. However, Russian support is also theme based, as it seeks to reduce Chinese influence in Central Asia. China believes it can replace the US as the dominant global power being the first to recover from the pandemic, while other nations moved into self-isolating modes as they battled the pandemic. That is now being proved wrong.

China's offensive diplomatic actions during the pandemic have led to its loss of global prestige and credibility.

Nations in Self-isolating Mode—Leadership Vacuum

The spread of the Coronavirus made nations realise that in such pandemics, they need to be prepared to fight battles alone. Allies and alliances would be similarly affected, hence support would remain limited. The European Union (EU) could not support its own grouping. The EU nations blocked movement of critical medical stores and equipment within themselves, aware that none in the union produces all its needs, interdependency being the very basis of its establishment. Central EU funding to kickstart the economy, reached after marathon discussions, was short of demands of severely impacted nations, adding to financial woes. Some countries remained more financially impacted than others. The discarding of the demand for issuing a Corona Bond has further divided the EU with Italy, France and Spain registering protests.

The US ignored NATO allies as it sought to control its internal spread of the virus and regain its economy. The US, which traditionally led battles against pandemics and recessions adopted a 'Nation First' approach, grabbing all resources needed to fight the virus, even from its allies and locked itself into a cocoon. It highjacked supplies meant for its allies, even from tarmacs, paying double and triple the price to Chinese manufacturers. A report in *The Guardian* stated, 'American buyers managed to "wrest control" of a shipment of masks from China that was supposed to go to France by offering three times the selling price.'

Trump banned move of medical stores across borders leading to anger in Canada. Trudeau, the Canadian PM, stated that it was a mistake which could backfire as Canadian medical professionals go to work in Detroit daily. A US official stated that the country would continue with its buying spree 'until we have way too much.' He admitted that, 'We've gotten our hands on every bit of it that we can.' Fareed Zakaria, a leading foreign affairs expert stated, 'The US is abdicating its role as leader of the world. During previous pandemics such as Zika and Ebola, the US was at the forefront of organising international effort. President Obama stepped up as the president of the world.' He added, 'In this case, the US is absent. It has no interest in a global leadership role … it is acting childishly.' Late acceptance of the threat posed by the virus forced Trump into an isolationist panic mode.

Globally it was nation first and the rest later. The global community moved into an isolation mode with virtual meetings being the order of the day. Thus, there appeared to be a leadership vacuum in the initial stages. China sought to

grab global pre-eminence by being the global supplier of medical stores. Even supply of faulty equipment was ignored as nations sought assistance. India proved to be more dependable supplying medicines globally, with no conditions. It was India which pushed through the G20 summit and SAARC collaboration. Its goodwill soared. As the situation eased, nations began to unite against China. The aggressive reactions of the Chinese, including offensive diplomatic counters, boosted by the belief of being powerful, lead to its downfall. With passing days, China began losing global respect and credibility.

Critical Infrastructure within National Control

Nations initially faced shortfalls in critical items when Wuhan shut down. Further, all medical equipment essential to contain the virus, manufactured within China, was diverted to Wuhan, with almost no supplies moving globally. Wuhan is also the base producer for Active Pharmaceutical Ingredient (API) requirements. It even impacted Indian drug manufacture. A major lesson which emerged from the pandemic was critical manufacturing, in this case medical stores, cannot be banked on existing global supply chains, which were initially created for economic gains. Thus, the economy became secondary to control of essential industry. Essential industry had to be moved into regions where the home country possessed power over manufacture and distribution. While such an action would lead to increased costs, it was acceptable, as nations realised that they were being held hostage by Chinese blackmail.

China demanded that France permit participation of Huawei 5G networks, which it refused. UK which had earlier accepted to consider Huawei in its plans backed down. It made similar demands to other nations. The Indian government also realised the importance of self-reliance. It has begun taking steps to reduce dependence on imports and enhance local industry. PM Modi pitched for Make in India and launched his 'vocal for local' campaign. The Indian government is also offering sops to manufacturers of medicines to reduce dependency on China for Active Pharmaceutical Ingredient (API). The movement of critical infrastructure led to nations considering expanding the current global supply chain. This implied moving manufacturing out of China, either back home or in nations possessing similar ideology.

Supply Chain Management

Manufacturing concerns belonging to the US, Japan and European nations are being compelled to move from China. This is the result of one of the most

important lessons drawn from the pandemic. Apart from spreading the supply chain, preventing it from being controlled by a single nation, it would also free it from Chinese blackmail. India is amongst the nations making a major pitch to draw in these companies. India supported the globe with medicines on demand and coordinated a joint approach with SAARC nations to combat the pandemic. It even dispatched medical teams whenever requested. Its global standing and reputation are currently at an all-time high, which could play a major role in attracting companies quitting China. This has angered China; Qiang Feng, from the national strategy institute at Beijing writes, 'Despite years of promotion of a "made-in-India" campaign and efforts to draw foreign investment in recent years, India still cannot take over China's position in global industrial chains.' China would never desire that these companies relocate to India as it could reverse the economic gap in the years ahead. The desire to move supply chains out was because China threatened nations using its power as the global supplier. With increased blame for not being transparent on the Coronavirus, China faced global isolation and responded by threatening to disrupt supply chains. Within China, there is increasing unemployment, closing industries and growing anger. With the determination of companies to relocate, Chinese economy would move into a downswing, impacting its global power. It is already facing demands for restructuring loans from its BRI as also in its further investment into the same.

Economic Impact on China and its Fallout

Chinese response to questioning and threats of pull out of industry has been a brazen display of its military and economic power accompanied by hostile diplomacy. In the current global environment, when nations are together seeking answers, hostility only produces negative vibes, adding to anger and determination to punish. The only way China can be punished is economically and that is possible by moving manufacturing out. Xi Jinping's attempted to restore some credibility by agreeing to an impartial investigation led by the World Health Assembly (WHA), that too after the pandemic ended. This was too little and too late, leading to loss of credibility. China should have seen the writing on the wall and responded with a positive approach, however, it failed to do so.

At the National People's Congress (NPC), China for the first time since 1980, stated, 'it wouldn't be setting a target for economic growth this year.' Writing for the BBC, Karishma Vaswani states, 'For the last 40 years, China's Communist Party has been able to promise a simple contract to its citizens: we'll keep your quality of life improving and you fall in line so that we can keep China on the right

path. The coronavirus could be putting that social contract at risk.' According to Chinese Premier Li Keqiang (NPC), China's economic growth, which shrank 6.8 per cent in the first quarter, the first contraction since at least 1992, was expected to drop more in the current quarter. He cited disruptions to supply trains, international trade and volatility in commodity markets as well as declines in domestic consumption, investment and exports.

Conclusion

Chinese offensive actions led to its loss of credibility. It assumed that its power was invincible, and it could push its weight globally. However, as it became evident in the WHA, nations refused to back China. Even African nations, who depend on Chinese funding and are part of its BRI, backed out. Subsequent actions by China, including threatening Taiwan, ASEAN nations and commencing a standoff against India, added to global anger. Taiwan, whose support during the pandemic was far better than China's, gained respect. In a display of resentment to China, Netherlands sent a planeload of tulips to Taiwan as gratitude for support during the pandemic.

Nations are determined to pull industries out of China and hurt its economy. China's hopes of replacing the US as a major power, even in the Indo-Pacific, is unlikely to materialise. Nations, which till recently were on the fence would move towards the US. A major lesson from the pandemic for China is that credibility matters globally. With the growing mistrust of China, nations will never standby and support its policies, despite all comprehensive power that the nation possesses. At the end of the day, China will lose in multiple ways with its current aggressive diplomacy and military diplomacy, despite being the first to override the pandemic.

Major General **Harsha Kakar** (Retd) is a regular contributor on Strategic and Military Issues. Views expressed are personal.

Employment of Mechanised Forces in Restrictive Terrain

POSHUK AHLUWALIA

Armoured formations repeatedly bypassed our strong points in the mountains. We never knew on which trail or road they would appear. Often, they came over terrain which we considered impassable to armour, and would suddenly be at our flanks

—Major General Wolfe Hauser
(Chief of Staff German Fourteenth Army-World War II)

The Indian Army is organised to meet the challenges of combat in all types of terrain and climatic conditions. Besides extremely difficult terrain, the land forces are also required to operate in open and restricted types of terrain. As there is abundance of restrictive terrain in the world and especially along our land borders and hinterlands, the mechanised forces must be prepared to fight in these conditions. Over the years, the employment of mechanised forces in our Northern and Eastern theatres has been rather limited due to which full potential of their combat power has not been utilised. While it is true that speed and mobility of mounted units is reduced in a restrictive terrain, armour protection, firepower, shock effect, and speed relative to dismounted forces in the same terrain make it an extremely potent force. As history is replete with examples where mechanised forces have been the battle winning factors, a few lessons will be drawn from a brief study of three battles in this article. There is a brief analysis of the broad contours of restricted terrain and also the employment of

mechanised forces in offensive operations at brigade level and below has been examined in detail.

Restrictive Terrain

To understand the employment of mechanised forces in restrictive terrain, we need to study the fundamental aspects of the restrictive terrain, its characteristics and broad parameters. Terrain should be classified in three categories. These are as follows:[1]

- **Unrestricted Terrain:** Unrestricted terrain possesses no characteristics that significantly impede movement. The terrain can be moderately sloping and have widely spaced trees or rocks but not to the degree that they influence rate of march. No effort is required to enhance mobility.
- **Restricted Terrain:** Restricted terrain hinders movement to some degree, little effort is required to enhance mobility, but formations may not be able to move at preferred speed or be able to transit to different movement techniques or formations. For mounted forces, restricted terrain may have steep slopes or moderate to densely spaced trees, rocks, or buildings. Further, swamps or rugged terrain are also considered restrictive terrain for dismounted infantry.
- **Severely Restricted Terrain:** Severely restricted terrain for mounted forces is characterised by steep slopes, densely spaced trees, or rocks, and little or no supporting roads. This type of terrain severely hinders or slows the movement of combat formations unless effort is made to enhance mobility. The classifications are by no means absolute. They must be considered in the context of the type of forces involved, engineer capabilities, and weather conditions.[2] The considerations of attack by mechanised forces in restrictive terrain will be simply a matter of scale rather than deciding on the possibility of employment.

Historical Examples: Mechanised Forces in Restrictive Terrain

Three historical battles of mechanised forces are discussed to illustrate the unique problems that arise in these kinds of operations. There are numerous examples available, besides the Battle of Zojila Pass in 1948, and each covers a wide range of restrictive terrains from the forested mountains and steep river banks in Greece and Italy, to the bare mountains and rugged terrain in Tunisia. The accounts look at three different regions over different times and with different experiences for conduct of such mechanised attacks. Lessons for the mechanised forces and the challenges common to all three operations will aid in establishing

key considerations for operations by mechanised forces in restrictive terrains.

- *Mechanised Forces in the Balkans: Battle for Greece*
- *The Battle of Kasserine Pass*
- *Mechanised Operations in Italy: Battle of Massa Marittima*

Mechanised Forces in the Balkans: Battle of Greece

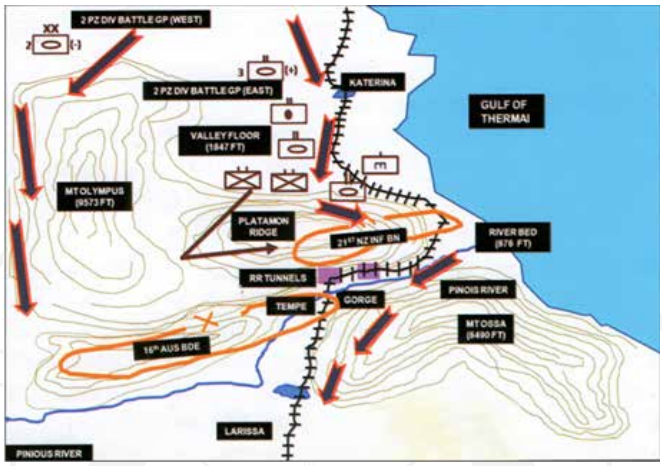
The Balkans campaign was part of Mediterranean Sea and Middle East Theatre of the World War II, from October 1940 to June 1941. The Battle of Greece is also known as Operation Marita, the aim of which was to prevent British from getting airbases within striking range of Romanian oil fields. The heights in the area of operations ranged from 800 to 6500 feet and were interspersed with rivers, deep gorges and dense tree cover.

Battle of Greece - April 1941

On April 6, 1941, the German army invaded Northern Greece.[3] The invasion of Greece was one of the first operations in which Germany employed Panzer tanks and motorised infantry units in the mountainous terrain. The commitment of armour to spearhead an attack through mountains proved to be a sound tactic. The seizure of Skopje (Yugoslavia) and the quick capture of Thessaloniki (Greece) could not have been accomplished without the Panzer Divisions. The actions of the 3rd Panzer Regiment (part of 2nd Panzer Division) are typical of the German Army's innovative use of armour in the campaign. Due to the compartmentalised terrain, the 2nd Panzer Division split into two battle groups.

The 3rd Panzer Regiment being the eastern battle group advanced through Katerina and on the night of April 14, met stiff resistance at Platamon Ridge held by the 21st Infantry Battalion (2nd New Zealand Division).[4]

Action at Platamon Ridge



Action at Platamon Ridge and Crossing the Pinios River: The terrain in the area was known to be unsuitable for tanks, but the attack by German Motorcycle Battalion supported by tanks surprised the defenders although the deeply broken terrain kept the tanks road bound.[5] After a reconnaissance, the Motorcycle and Infantry Battalion conducted a wide flanking move from the west and hit the left flank and rear of the defences, respectively. Simultaneously, tanks frontally attacked the ridge dislodging the defenders forcing them to flee south till the Pinios River. German tanks could advance further only after the engineers opened the road, and subsequently two tank companies reached Tempe Gorge[6] which was a formidable obstacle with high vertical embankments and the Pinios River flowed in the middle. A railway track and road snaked along the northern and southern banks, respectively. Absence of bridges made it nearly impossible to negotiate and push forward logistic requirements and evacuate casualties. Hence air drops were utilised. However, it was partially successful.[7] Notably, the Germans partially succeeded in pushing a tank company along the railway line, considered to be impassable. While retrieving the tanks, a crossing across the Pinios River was successfully attempted and by nightfall German tanks had crossed although under heavy allied fire. Bold employment of mechanised forces across terrain regarded as impassable decided the issue and the force broke into open country and entered Larissa.[8]

Major Lessons of the Battle of Greece: The importance of thorough reconnaissance before committing mechanised forces in restrictive terrain; bold and audacious leadership is key for successful offensive mechanised forces operations in mountains; logistics planning would be the battle winning factor in such terrains are some important lessons from the Battle of Greece. Despite the mountainous and riverine terrain, bold employment and the German superiority in mechanised forces, and air power led to the quick conclusion of operations. A bold decision was taken for tanks to ford River Pinios during the night, which paid rich dividends.

German Armoured reconnaissance Vehicle and Tanks along the Athens-Salonika Railway Line

The Battle of Kasserine Pass[9]

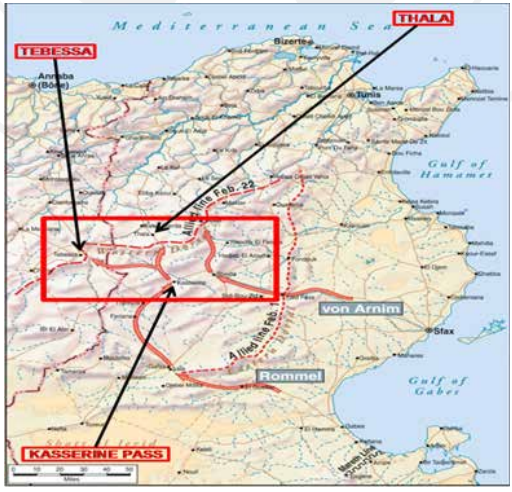
The Battle of Kasserine Pass was a series of battles of the Tunisia Campaign of the World War II that took place in February 1943. It was significant because it was the first large-scale meeting of American and German forces during the World War II. General Erwin Rommel was dispatched to North Africa in February 1942, along with the new Afrika Korps, to prevent his Italian Axis partner from losing its territorial gains in the region to the British.

In November 1942, Rommel's Panzermee Afrika was routed in the second battle of El Alamein, and the surviving German and Italian forces were retreating through the deserts of northern Libya. Rommel seemingly was trapped between American forces advancing to block his retreat and British forces in hot pursuit to his rear. For Rommel, the end seemed near as the Allied air and naval forces often reduced his supplies to a trickle as Hitler's focus was towards the Russian front. Having retreated in an orderly manner about 1400 miles, Rommel believed that it was necessary to inflict a stinging defeat on the newly arrived Americans.

Tunisia Relief Map

The region consisted of arid plains and formidable mountain ranges with the Western and Eastern Dorsal being the two off shoots of Atlas Mountains. The Kasserine Pass is a 3.2 kilometres gap in the Western Dorsal. The heights in the area range between 500 and 1500 metres and the temperatures are high during the day and low during the night. Rainy season during the operations created certain boggy patches in the ground. Rommel was a keen observer, a strategic opportunist, and saw weakness in the untested American forces. By smashing through the inexperienced American line, he could rush through Kasserine Pass and take Tebessa, a major Allied supply hub. There was also a possibility to sweep north and take the remaining Allied forces which was facing the Fifth Panzer Army in the flank and rear.

Battle of Kasserine Pass



The first part of the German offensive began on February 14, with the 10th Panzer Division going through the Faid Pass, under the cover of a blinding sandstorm. Simultaneously, 21st Panzer Division manoeuvred through the mountains to the south and then turned north to link with 10th Panzer Division. Map of Battle of Kasserine Pass refers. The American infantry had occupied defences on hill tops, to support American armour. Due to lack of mutual support among the deployments on the hilltops, the American infantry was reduced to helpless observers. Once the sandstorm lifted, 60 German tanks and numerous other vehicles appeared and American armour moved forward to confront the growing threat. The inexperienced American crews were facing Mark VI Tiger tanks that had twice the firing range of American tanks. The combination of German artillery shells and long-range tank fire proved too much for the Americans. Only seven of the 51 American tanks survived the defeat. The reinforcement of an additional tank battalion met the same fate at the hands of the Germans, with the entire battalion wiped out. Subsequently, the 10th Panzer Division moved through the pass in force, only to be met by a handful of British Valentine and Crusader tanks. American tank destroyers positioned roadblocks but twenty-two American tanks and 30 half-tracks littered the valley floor.

The Germans broke through the main part of Kasserine Pass and seemingly on the point of a breakthrough. Allied units were being reinforced and redeployed into the battle, and gave the Germans a rough time on the Tebessa road. Accurate tank and artillery fire stalled the Axis drive while American infantry pushed the Germans back. Low on fuel and resources, Rommel conceded the obvious and called off all further offensive actions, and withdrew to the east. Having proved his mettle with fewer forces and mechanised elements, the Desert Fox's last gamble had failed.

Major Lessons of the Battle of Kasserine Pass: The main problem of the Axis forces was the logistics that resulted in a crippling shortage of fuel and ammunition; however, the Germans were always bold, as they endeavoured to surprise the Allies by using bad weather and darkness for launching an offensive; Germans concentrated their offensive and therefore could puncture the defences, while the Allies distributed the forces over the complete front; the Allies faltered by deploying infantry on heights which were so high that they were not in mutual support to each other and also couldn't support own tanks; the Germans employed artillery effectively every time they launched an offensive against the Allies; and they employed a new weapon "Nebelwefer", Multiple Rocket Launcher, which brings out the importance of an advanced weapon system in battle.

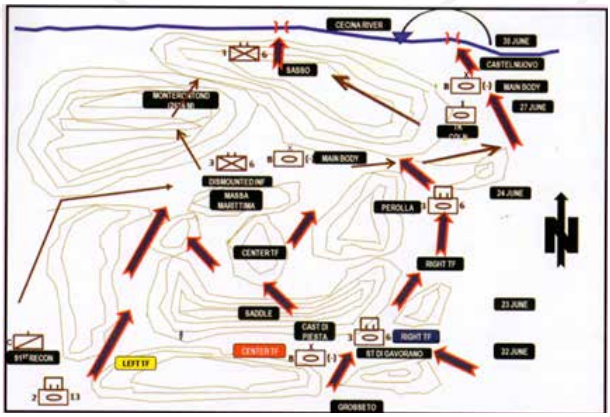
Mechanised Operations in Italy: Battle of Massa Marittima

In May 1943, post defeat of Axis Power in North Africa, the Allies wanted to invade Italy, with an aim to remove the influence of the Axis forces in Mediterranean Sea and, also to open it for allied traffic. The invasion commenced with amphibious landing on September 03, 1943. The US Army deployed one armoured division and eight separate tank battalions in the theatre. The attack by a Combat Command of 1st Armoured Division in the Apennines from Grossetta (Italy) to the Cecina River (June 22-30, 1944) was typical of US armoured operations in Italy.[10]

The terrain was largely in the form of gentle rolling hills, with bottlenecks at certain points and laced by streams and deep gorges. There were only a few trafficable roads wherein every mile had its share of bridges and culverts, which the German defenders consistently demolished. The roads twisted around hills and mountains and each road curve, with its blown bridge or culvert, became an excellent site for German roadblocks and ambushes.[11]

The 1st Armoured Division was organised into Combat Command A (East), Combat Command B (West) and Combat Command R (Reserve). Combat Command East was further divided in three task forces namely Left Task Force (LTF), Center Task Force (CTF) and Right Task Force (RTF). LTF and RTF were based on light tanks (M5 Stuart Tanks) whereas CTF was based on medium tanks (M4 Sherman Tanks). This was based on the availability of superior roads and German armour concentration in the centre zone compared to the poor road network in the flanks. On June 22, 1944, Combat Command B attacked, advancing slowly against stiff opposition and a hard fight in the centre reached Cast di Pietsa by nightfall.[12]

Combat Command B's Attack up to Cecina River



The Germans held the saddles and bottlenecks in strength. Along the road to Massa Marittima the tanks of CTF were ambushed at one such saddle. Although RTF tried to relieve pressure by moving northeast of the saddle, it could not drive away the German tanks supported by infantry. The LTF was unable to assist due to the compartmentalised terrain in the West. An aerial photograph showed a faint trail towards the west which was left unguarded by the Germans. The flank was reinforced and the flanking force exploiting the trail reached high ground overlooking the saddle. Now under effective domination and threat to the line of retreat, the Germans withdrew. Based on previous losses, a thorough dismounted reconnaissance preceded all future movement over mountainous terrain.[13]

Continuing its attack towards Massa Marittima, RTF encountered heavy enemy resistance at Perolla. The scouts found a bypass allowing the tanks to move east and the infantry circled from west forcing the Germans to withdraw. CTF was further divided into two smaller forces due to difficult terrain and the recce squadron went further west to threaten the rear of Massa Marittima. The appearance of five columns to their front, flanks and threatening their rear was just too much for the German defenders forcing them to withdraw from Massa Marittima.[14] Before moving further north, Combat Command B dealt with the threat of enemy holding the height on its left flank by securing them with dismounted armoured infantry. The tanks moved forward as the infantry secured the heights.[15] The force picked its way over impassable mountainous terrain and successfully assaulted Sasso. Attacking the German Cecina River defences, the force captured Castelnuovo and established a bridge head on the Cecina River on June 30.[16]

Major Lessons of the Battle Massa Marittima: There are both merits and drawbacks of attacking over several routes in mountains. An advantage here was the enemy's inability to defend every avenue of approach with strength. The use of five different routes to overwhelm the German defenders at Massa Marittima as also threatening his rear and line of retreat illustrates this. A disadvantage was the possible lack of mutual support between units. LTF's inability to support the CTF during the fight at saddle in June 1944 is a good example of this. Securing heights along the valley and the axis of advance is critical.

Fundamental Factors to be Considered

Having examined three historical examples, the major considerations identified are those aspects of mechanised attacks in restrictive terrain which are critical for an operation to be successful. *The four vital considerations are: reconnaissance and intelligence picture, security of the force and surprise, engineer support, and logistics.*

Reconnaissance and Intelligence Picture: As attack in restrictive terrain depends on limited routes, real time awareness of the condition of the route is essential. Attack by mechanised units in restrictive terrain will often be limited to one or a few constricted routes and narrow tracks. These routes are subject to vagaries of weather and terrain, as was the case of German tanks moving along the Tempe Gorge and across the Pinios River. Only real time reconnaissance by similar vehicles can truly determine the state of a route and such information is critical when the attack depends on a tenuous route. Reconnaissance will identify areas of bottlenecks, presence of obstacles and mines along a route. Accordingly, breaching assets previously grouped to an attacking force can be employed to affect a breach as required, or perhaps another route chosen. At critical points, the attacking force commander may want to emplace a blocking force, reposition his security element(s), or halt indirect fire assets so they are prepared to fire. Only maps and aerial photos are insufficient especially when there is no bypass to a blocked route. Hence, first-hand and the latest information gained by thorough reconnaissance is of greater importance. It should further be supplemented to build the intelligence picture by gaining information through technology enabled systems, satellites and unmanned systems like the UAVs.

Attack by mechanised units in restrictive terrain will often be limited to one or a few constricted routes and narrow tracks.

Force Security and Surprise: Force Security operations are conducted to "obtain information about the enemy and provide reaction time, manoeuvre space and protect the main body." Security for the mechanised force attacking in restrictive terrain is derived in several ways, all of which must be carefully weighed with the mission and the capability of the enemy. Similarly, achieving surprise plays an important role in ensuring success. Achieving surprise would entail appearing at a place at a specific time when not or least expected. This also ensures force security. The composition of the force, critical points along the route, and availability of multiple or mutually supporting routes will guide the commander in taking measures to protect his attacking force. All three historical examples showed a mechanised task force employing infantry supporting tanks as also exploiting impassable terrain and achieving surprise. The force must be organised to provide combat power to secure the flanks of the attacking force when necessary. Mechanised infantry's capability of matching mobility, firepower, protection and dismounted sticks needs to be exploited to defeat a dismounted anti-tank threat.

Synchronisation of transition from mounted move to dismounted clearing of enemy is critical. The designation of a reconnaissance element(s), and security element(s) gains importance when attacking in restrictive terrain. These forces could be part of the main body with specialised "be prepared" security missions if terrain prohibits them from operating an optimal distance from the main body. This enables the main body to move quickly on high speed avenues of the attack and remain prepared for the slower progress of dismounting and clearing enemy to the flanks.

Speed provides some security against small arms, automatic weapons fire, mortar and dismounted antitank fire. Security and surprise should be built into the plan by means of a thorough analysis of the axis of attack and the available intelligence. Thereby ensuring maintenance of speed, yet have a good idea of where to increase security to ensure not getting ambushed or stopped by obstacles. Multiple and/or mutually supporting axes, must be carefully weighed for advantages gained by spreading the force and gaining more flexibility against the dissipation of combat power and specialised assets such as engineers, scouts, mortars, artillery, and logistic assets (especially, fuel, ammunition, and medical).

Engineer Support: In restrictive terrains, as the routes available to attack are limited, it logically follows that the enemy can obstruct the attack with less effort. Mobility, counter mobility, and survivability are all essential elements to a mechanised attack in restrictive terrain. As seen in the historical examples, wide range of engineer capabilities is critical to attacking forces to ensure seamless progress of operations in restrictive terrain. Therefore, task-based allotment of redundant engineer assets is vital to a mechanised force conducting such an attack. For the most part, mobility tasks will be the emphasis of engineering effort to support attacks in restrictive terrain, although one should not forget the utility of counter mobility and survivability tasks as well. Finally, once an attacking force reaches its objective, it should begin work to make its position survivable in preparation for a counter attack.

Logistics: To be successful while attacking in a restrictive terrain, the force must be supported especially in terms of fuel, ammunition, medical evacuation, and vehicle recovery. Additionally, allotment of necessary combat power to secure Axis of Maintenance (AOM) as the attack progresses, or risk it being temporarily cut needs to be decided. After capture of Kasserine Pass, Rommel's forces faced a crippling shortage of fuel and ammunition and the Axis advance came to a grinding halt. If the AOM behind the column is not secure, logistic capability to also include medical and recovery needs should be inbuilt for maintaining the momentum of an attack. Recovery resources must be close at

hand (and redundant due to their criticality and low density) to move vehicles to enable the attack to continue. If vehicles cannot be repaired and the AOM is not secured they must be abandoned and destroyed else the enemy will use them. Like the Germans captured American equipment in Kasserine Pass which was later partly recovered by the Americans once the Germans retreated east.

Employment Philosophy of Mechanised Forces in Restrictive Terrain: Indian Context

Stuart tanks at Zojila Pass (11553 feet)

The Indian Army is prepared to fight all along our land borders as also abroad to accomplish any given mission. Such an orientation implies terrain and weather should not prevent the Indian Army from achieving its objectives. The environment of combat could range from blistering deserts of the Thar to, rain forests and jungles in the North East, mountains, and urban areas. There are several areas in the North East, and Jammu and Kashmir, especially Jammu and the Ladakh region, which lend themselves to employment of mechanised forces. The concept of integrated battle groups, where the composition of the force must be based on the nature of terrain and employability, envisaged enemy opposition, etc. In 1948, the Indian Army employed light tanks (Stuart) in the Battle of Zojila Pass, which took the enemy by total surprise.

Infantry units are highly effective in restrictive terrain, whereas mechanised infantry and armour units are thought to be more suited for unrestricted terrain. This very thought needs to change; an attacker must seek to avoid direct attacks on the enemy's strength. The characteristics of offensive operations (especially surprise and tempo) reinforces attacking the enemy at a place where he is not prepared, attacking

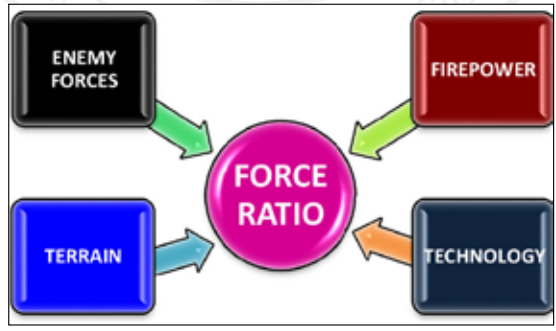
Employment of mechanised forces automatically increases the firepower and technological quotient of an attacking force thereby reducing the required force levels.

through "seemingly impassable terrain" and seeking a tempo that prevents the enemy "from recovering from the shock and effect of the attack". In a difficult terrain, an enemy force, more often than not, will not defend the obvious high-speed avenues of approach. Such opportunities must be exploited by employing mechanised forces, to be able to penetrate the enemy's defences, and attack his rear areas or lines of communication.

While planning and conducting offensive operations the factors of Mission, Enemy, Terrain and Weather, Troops and Time available (METT-T) are critical. "Manoeuvre over difficult terrain may be desirable to surprise the enemy and an attacker must plan to avoid (or negotiate) restrictive terrain or, perhaps, use it to protect his flanks. Light forces can use restrictive terrain to deny the enemy its use or to facilitate the manoeuvre of heavy forces. Hence, the need to coordinates the movement of forces to maximise cover and concealment and to quickly concentrate forces for the attack at the right time to preserve the element of surprise. A combined arms approach to war fighting with surprise, speed, shock, and firepower, are essential ingredients of defeating the enemy and imply the need to conduct mounted attacks.

Employment of mechanised forces where unexpected would result in success with much lower force ratios. Force ratios are a cumulative effect of four factors: enemy forces, terrain, firepower and technology. Increase/decrease in any of the four factors would entail higher/lower force ratios to achieve success. Employment of mechanised forces automatically increases the firepower and technological quotient of an attacking force thereby reducing the required force levels.

Force Ratio



Source: Prepared by the author

The deserts are open terrain, interspersed with difficult natural obstacles that must be factored in while planning operations in a bold and offensive manner. Due to good observation across the flat terrain, it is difficult to mask movement of large columns—innovative timings, methods and EW means should be used to achieve surprise. High altitude and mountainous terrain also offer more than adequate areas which lend themselves to employment of mechanised forces at brigade and below level. Effective employment of mechanised forces would require a brigade sized force to have multiple routes in their zones if they are to attack effectively. The force should plan to use light elements to fix the enemy in restrictive terrain as the heavy elements attack the enemy in force on an avenue through restrictive terrain.[17] There would be instances where in mechanised forces are not in a position to progress in operations due to restrictions on manoeuvre because of terrain implications. That's when dismounted infantry can move on untrafficable terrain to attack from an unexpected direction to permit the resumption of mounted combat.[18]

Just because one dirt trail transits otherwise impassable terrain does not mean that it can be neglected as a possible avenue. Without proper defensive force or surveillance on such a route, a mechanised column can quickly get in the enemy rear area. It is important that all previously identified areas advantageous to the enemy be cleared to avoid ambush or flanking enemy attack. It will be hard for the battalion task force to maintain mutual support, let alone flank and rear security, if it finds itself forced to move along isolated mobility corridors. At the battalion level techniques for tank and mechanised infantry teamwork during the approach to an objective in a deliberate attack are critical.

The mechanised infantry should remain mounted as long as possible and should dismount only if necessary. Sticks may need to lead an attack through heavily wooded areas, over very rough terrain or across defended rivers that cannot be crossed by armoured vehicles. In such a scenario the amphibious capability of Infantry Combat Vehicles (ICVs) needs to be exploited to the hilt. Tanks should revert to a support by fire role if terrain, obstacles, or enemy antitank weapons restrict or stop their movement. However, as the problems are overcome, the tanks should pass through the mechanised infantry and continue to assault the objective. The leading company/team commander should avoid open areas, obvious avenues of approach, and routes dominated by key terrain. In such a spectrum of terrain and enemy there is an overlap of environment where heavy and light forces should operate. The use of task organised forces in this overlap takes advantage of the strengths of both kinds

of units and offsets their weaknesses. Such teams play a key role in supporting light infantry in restrictive terrain which hinder move of heavy forces. Such a situation prescribes combined arms operations, and encourages the use of the indirect approach and surprise in offensive operations.[19] With respect to mechanised operations in restrictive terrain, there needs to be a synthesis of terrain, doctrine, and tactical missions. The previously explained historical battles make the challenges of attacking in restricted terrain more apparent and also bring out lessons to overcome them.

Lessons from History: Employment of Mechanised Forces in Restrictive Terrain and their Applicability

- **Offensive Operations:** While undertaking offensive operations in restrictive terrain, the importance of reconnaissance has been highlighted in all the battles. Aerial as well as ground reconnaissance becomes a vital part before launching an offensive. In restrictive terrain, launching an offensive from multidirectional approach and threatening the line of retreat/AOM is a way to defeat, prematurely. The concept of combined arms operations also plays a pivotal role during operations.
- **Defensive Operations:** A well sited defence with continuous surveillance by physical and electronic means becomes a very essential constituent of defensive operations. Correct and timely intelligence input of enemy concentration or movement can greatly assist in right decision making and effective employment of reserves to beat enemy design in time and space. An obstacle system covered by observation and effective fire enhances defensibility. The judicious employment of support arms like attack helicopters, artillery and engineers is an essential facet to fight a successful defensive battle. Simply holding on to heights which may not be in mutual support to dominate the valley floor should be avoided. Employment of mechanised forces in a bold and offensive manner adequately supported by infantry will pay rich dividends.
- **Conceptual Changes:** The employment of mechanised forces should be exploited but the terrain would dictate the extent. These modifications would be at the conceptual and tactical level. Conventional employment will have to be modified and hence more unconventional employment will have to be restored to. The limited manoeuvre spaces while operating in restricted terrain necessitates a review in conventional tactics of mechanised forces as standard drills cannot be followed due to narrow avenues of approach.

- **Small Teams:** Restricted terrain precludes concentrated employment of mechanised forces and hence small teams consisting of tanks, infantry combat vehicles, infantry, artillery, and other arms will yield better results, although small teams should not be confused with dissipation of forces over an extended area. Due to difficulty of ensuring mutual support and switching of forces, concentrated application can be achieved by centralised reserves and avoiding mathematical distribution.
- **Use of Force Multipliers:** Use of attack helicopters in conjunction with the mechanised forces to swiftly move across the terrain which more often than not will be compartmentalised and engage the enemy from a flank will be very effective and would overcome the inability of ground force to switch. Further other elements such as long-range vectors, precision munitions, ISR capability, Special Forces, etc., need to be exploited to the fullest.
- **Training Aspects:** Focused and specific training of troops before launching into any operations has been adequately highlighted in all battles. In addition to basic tactics, the aspects peculiar to operations in restrictive terrain need to be trained to ensure positive outcomes such as follows:
    - **Driving Skills:** Driving skills need to be honed for narrow tracks and steep gradients. While training stress should be on psychological training over pure driving skills. It is important, if feasible, to familiarise drivers with the terrain of operational areas, by driving in own areas similar to operational areas across the border. The treacherous routes may fatigue the driver over long durations, therefore, when not in contact, the gunners may drive and be trained accordingly. The training in respect of knowing the capability of tanks and ICVs for gradient negotiations and fording/ floatation is also important for both commander and driver.
    - **Firing Skills:** In mountainous terrain specifically, the enemy, more often than not, will be deployed beyond the elevation limit of the tank's main gun. Hence, the high elevation firing capability of ICVs needs to be exploited. The impact of high altitudes on the ballistic performance of weapon systems should be known to all ranks. These must be incorporated in annual field firings.
    - **Joint Training:** Combined Arms Concept plays a crucial role in both offensive and defensive operations. To expect positive results and harmonious actions during conflict, joint training necessitates additional deliberation especially in restricted terrain.

- **Communication:** Restricted terrain inhibits effective radio communication which may lead to loss of command and control. The commanders need to be trained on how to be in communication by attaining heights to avoid screening. The commanders require to anticipate their actions and need to be trained to act as per plan in ambiguous conditions. The contingencies need to be incorporated and every crew needs to know the actions which need to be undertaken when out of communication. Further redundancy in means of communication needs to be ensured. Also, execution of plans should be decentralised so that junior leaders take initiative and accomplish missions based on the directives given by higher commanders.
- **Logistics:** An essential part of any operations is 'pragmatic' logistics planning. In restricted terrain, the consumption of fuel, oils and lubricants increases. Hence, the same needs to be deliberated upon and emphasized. Preventive maintenance to reduce failure of equipment, a robust recovery mechanism to overcome frequent terrain induced breakdowns and an effective and prompt casualty evacuation mechanism are critical to success.
- **Leadership:** Leadership plays an important role in the outcome of any battle. An aggressive attitude of a Junior leader will always bring positive results in restricted terrain. The leader with positional advantage will be at a significant advantage. A leader with innovative tactics, especially in restricted terrain, like offensive use of mechanised forces at places when such forces are not expected will always catch the enemy off guard.

Conclusion

History provides numerous examples of mechanised forces being used decisively in mountains, jungles, and other types of restrictive terrain. There are various examples of Indian Army's employment of armour in difficult terrain such the Battles of Shelatang, Zojila, Chushul and Imphal to name a few. The employment of armour did change the tide and brought in force asymmetry at the point of decision thereby ensuring success. Our employment philosophy should not be limited to using light infantry in restrictive terrain and mechanised forces in open terrain-current philosophy tends to reinforce that mind set. Training and organising for these operations will not only increase the capability and readiness of units to handle such missions, but will also aid in the development and refinement of tactics, techniques and procedures. The world over, militaries

are graduating towards mechanisation and an all arms organisation even at the battalion level. We ourselves need to deliberately analyse the employment possibilities of mechanised forces along our frontiers and thereby bring in force asymmetry against our adversaries.

Lieutenant Colonel **Poshuk Ahluwalia** is a distinguished pistol shooter and is currently posted in Dehra Dun. Views expressed are personal.

Notes

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2. Ibid., 2-16.
3. The German Campaign in the Balkans (Spring 1941) a model of crisis planning, by Gen - Maj Mueller – Hillebrand.
4. Mellenthin, Panzer Battles, 34.
5. Ibid.
6. Mellenthin, Panzer Battles, 35.
7. Ibid.
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10. Henry Frankel, et al., "Armor in Mountain Warfare," (Armor Officer Advanced Course, U.S. Army Armor School, 1950), 103.
11. R.K. Gottschall, "Mountain Goat M4," D 3 d, Vol LIV No. 1 (January-February 1945), 29.
12. Curry N. Vaughn, et al., "Mud, Mountains, and Armor," (Armor Officer Advanced Course, U.S. Army Armor School, 1950), 38.
13. Ibid., 46.
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15. Note 12, 51.
16. Note 11, 32.
17. U.S. Department of the Army, Field Manual 71-3, Armored and Mechanized Infantry Brigade (Washington, DC: U.S. Government Printing Office, May 1988).
18. U.S. Department of the Army, Field Manual 71-2, The Tank and Mechanized Infantry Battalion Task Force (Washington, DC: U.S. Government Printing Office, September 1988), 1-13.
19. U.S. Department of the Army, Field Manual 71-123, Tactics and Techniques for Combined Arms Heavy Forces: Armored Brigade. Battalion/Task Force, and Company/ Team (Washington, DC: U.S. Government Printing Office, September 1992), iii.

Covid-19 and its Global Implications: Reading the Impact Factor

AMRITA JASH

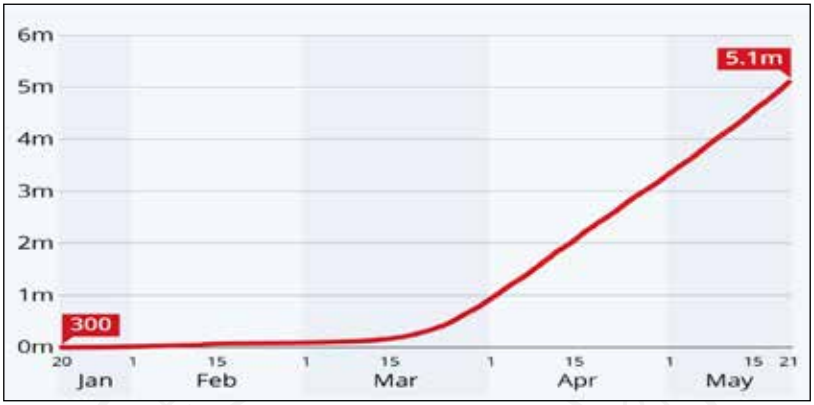
We are at war with a virus- and not winning it

—UN Secretary General Antonio Guterres,
Virtual G20 Summit, 26 March 2020[1]

Introduction

The COVID-19 Pandemic has emerged as the biggest threat to human security in the 21st century. With health at the core, the SARS-CoV-2 virus has resulted in 7,690,708 cases of infections and 427,630 deaths, as of June 14, 2020.[2] The global spread has been rapid since December 31, 2019, when for the first time the Wuhan Municipal Health Commission in China's Hubei province declared the outbreak of a "pneumonia of unknown cause" in Wuhan by confirming 27 cases.[3] It was only on January 7, the Wuhan authorities changed the name to "pneumonia caused by the novel coronavirus". In response to the Wuhan epidemic, the World Health Organization (WHO) raised concerns by first declaring the outbreak as a "public health emergency of international concern" on January 30, 2020, followed by naming the new coronavirus disease as "COVID-19" on February 11, and finally, declaring it as a global "pandemic" on March 11.[4]

Figure 1. Trajectory of COVID-19 Cases (Jan-21-May 2020)



Source: Adapted from Statista.[5]

What is noteworthy is that while on March 10, Chinese President Xi Jinping announced "victory in Wuhan" against the virus outbreak,[6] the epicentre saw a tectonic shift from China's Wuhan to that of Italy in Europe, followed by United States (US) as the new hotspots of the virus. The most affected countries as of June 14, 2020, are listed below.

Table 1: List of 10 Most Affected Countries (as of June 14, 2020)

Country	No. of COVID Cases	No. of Deaths
United States	2,032,524	114,466
Brazil	828,810	41,828
Russia	528,964	6,948
India	320,922	9,195
United Kingdom	294,379	41,662
Spain	243,651	27,137
Italy	236,651	34,301
Peru	220,749	6308
Germany	186,269	8,787
Iran	184,955	8,730

Source: Prepared by the Author by based on WHO data.[7]

Given its rapid progression, the U.N. Secretary-General Antonio Guterres at the virtual G20 Meeting called it "[t]he fury of the virus [that] illustrates the folly of war".[8] The global mapping suggests two interesting perspectives: first, China witnessed a downturn despite its significant population size of 1.4 billion;

The world anger on China's culpability has led to global backlash against China.

second, the sum of cases of all other countries severely affected have exhibited an exponential growth that exceeded China. Most notably, by March, China's share of new cases dropped from more than 90 per cent to that of 1 per cent,[9] with Beijing reporting zero "domestically-transmitted COVID-19 cases" in Wuhan on March 19,[10] and 1616 imported cases, as of April 23.[11] Currently, China's statistics remain: 83,181 COVID-19 cases, of which 1,837 are inbound cases; a total of 112 asymptomatic patients are under medical observation and the death toll stands at 4,645.[12]

In this context, the paper seeks to examine the global consequences of the COVID-19. Here, the key element of assessment is the 'impact factor of COVID-19' that acts as the key determinant of understanding the effect of the virus outbreak.

From Wuhan Epidemic to a Pandemic: Key Trends and Responses

COVID-19 has exposed the truth that no country is strong enough to be immune to the virus. The five major trends of the virus outbreak are as follows:

First, the most affected COVID-19 countries are those that are developed nations, such as: US, Italy, UK, Germany and others. While Taiwan has set the best example in handling of the pandemic with its proactive contact tracing measures.

Second, preventive measures adopted by countries to control the virus include: travel restrictions, lockdown measures, social distancing and herd immunity mechanisms, rigorous testing, and usage of mobile apps to track the spread of the virus. Countries are adopting 'contactless' methods in various everyday activities to curb the spread of the virus.

Third, to fight the pandemic, several global responses have been undertaken. Such as, G20 nations have injected over $5 trillion into the global economy to combat economic disruptions.[13] While the International Monetary Fund (IMF) and the World Bank have also jointly called for the suspension of debt payments from developing countries.[14] Most significantly, the WHO, UN Foundation and Swiss Philanthropy Foundation have jointly launched the first-of-its-kind 'COVID-19 Solidarity Response Fund'.[15] In South Asia, a 'COVID-19 Emergency Fund' under SAARC has been established to fight the pandemic.[16]

Fourth, to mitigate the effects of the pandemic, countries have introduced stimulus packages which are a mix of fiscal support, monetary support, ease of doing business and others. As on May 2020, most G20 countries have committed to fiscal stimulus packages to stimulate the economy and address the immediate issues of the workers, distressed sections of the society, micro, small and medium enterprises, and the likes. The values of stimulus as a share of GDP are: Japan 21.1 per cent, US 11 per cent, Australia 9.9 per cent, Canada 9.8 per cent, European Union 4 per cent, India 3.5 per cent and others.[17]

Fifth, there is a growing global resentment towards Beijing's lack of transparency and reluctance to act and warn the globe at the early stages of the Wuhan epidemic. This has resulted into an urgent call for independent investigation of the zoonotic spread of the virus in Wuhan that led to the pandemic.

The Risk Profile of COVID-19: Global Indicators to Watch

With 213 countries affected by COVID-19, the global order has witnessed a grinding halt. The implications of the pandemic highlight marked shifts in various quarters, wherein, the recovery readiness has no quick-fix solution to the damage. The global implications of the crisis have raised significant concerns. The areas to note are as follows.

- **The Global Economy** exhibits signs of severe distress with alarming concerns over an approaching financial crisis. As per IMF's *World Economic Outlook*, the global economy is projected to contract sharply by three per cent in 2020—the steepest slowdown since the 1930s Great Depression and worse than the 2008–09 Financial Crisis. However, the economy is projected to grow by 5.8 per cent in 2021 as the situation normalises.

  Wherein, advanced economies will grow by 6.1 per cent; such as the US, Japan, the UK, Germany, France, Italy and Spain are expected to contract this year by 5.9, 5.2, 6.5, 7, 7.2, 9.1 and 8 per cent respectively.[18] While emerging markets and developing economies are expected to grow by 1 per cent.[19]
- **The Global Gross Domestic Product (GDP):** As per OECD's March Report, the annual GDP is projected to drop to 2.4 per cent in 2020 as a whole, from that of 2.9 per cent in 2019, with an added negative growth in the first quarter of 2020.[20] The global growth is expected to drop to 1 and half per cent in 2020, declining to half the rate as projected prior to the virus outbreak. Wherein, the G20 economies are likely to face a downward revision given the adverse

impact on confidence, financial markets, the travel sector and disruption to supply chains.

In June 2020, World Bank's *Global Outlook* suggested that the baseline forecast envisions a 5.2 per cent contraction in global GDP in 2020 (using market exchange rate weights). This marks the deepest global recession in decades, despite the extraordinary efforts of governments to counter the downturn with fiscal and monetary policy support. The real GDP forecasts is noted in Table 2.

Table 2: Real GDP Forecasts (Year-on-Year % Change)

						% point difference from Jan 2020 projections	
	2017	2018	2019e	2020f	2021f	2020f	2021f
World	**3.3**	**3.0**	**2.4**	**-5.2**	**4.2**	**-7.7**	**1.6**
Advanced economies	**2.5**	**2.1**	**1.6**	**-7.0**	**3.9**	**-8.4**	**2.4**
United States	2.4	2.9	2.3	-6.1	4.0	-7.9	2.3
Euro Area	2.5	1.9	1.2	-9.1	4.5	-10.1	3.2
Japan	2.2	0.3	0.7	-6.1	2.5	-6.8	1.9
Emerging market and developing economies	**4.5**	**4.3**	**3.5**	**-2.5**	**4.6**	**-6.6**	**0.3**
Commodity-exporting EMDEs	2.2	2.1	1.5	-4.8	3.1	-7.4	0.2
Other EMDEs	6.1	5.7	4.8	-1.1	5.5	-6.2	0.3
Other EMDEs excluding China	5.4	4.8	3.2	-3.6	3.6	-7.6	-0.8
East Asia and Pacific	6.5	6.3	5.9	0.5	6.6	-5.2	1.0
China	6.8	6.6	6.1	1.0	6.9	-4.9	1.1
Indonesia	5.1	5.2	5.0	0.0	4.8	-5.1	-0.4
Thailand	4.1	4.2	2.4	-5.0	4.1	-7.7	1.3
Europe and Central Asia	4.1	3.3	2.2	-4.7	3.6	-7.3	0.7
Russia	1.8	2.5	1.3	-6.0	2.7	-7.6	0.9
Turkey	7.5	2.8	0.9	-3.8	5.0	-6.8	1.0
Poland	4.9	5.3	4.1	-4.2	2.8	-7.8	-0.5
Latin America and the Caribbean	1.9	1.7	0.8	-7.2	2.8	-9.0	0.4
Brazil	1.3	1.3	1.1	-8.0	2.2	-10.0	-0.3
Mexico	2.1	2.2	-0.3	-7.5	3.0	-8.7	1.2
Argentina	2.7	-2.5	-2.2	-7.3	2.1	-6.0	0.7
Middle East and North Africa	1.1	0.9	-0.2	-4.2	2.3	-6.6	-0.4
Saudi Arabia	-0.7	2.4	0.3	-3.8	2.5	-5.7	0.3
Iran	3.8	-4.7	-8.2	-5.3	2.1	-5.3	1.1
Egypt[1]	4.2	5.3	5.6	3.0	2.1	-2.8	-3.9
South Asia	6.5	6.5	4.7	-2.7	2.8	-8.2	-3.1
India[1]	7.0	6.1	4.2	-3.2	3.1	-9.0	-3.0
Pakistan[1]	5.2	5.5	1.9	-2.6	-0.2	-5.0	-3.2
Bangladesh[1]	7.3	7.9	8.2	1.6	1.0	-5.6	-6.3
Sub-Saharan Africa	2.6	2.6	2.2	-2.8	3.1	-5.8	0.0
Nigeria	0.8	1.9	2.2	-3.2	1.7	-5.3	-0.4
South Africa	1.4	0.8	0.2	-7.1	2.9	-8.0	1.6
Angola	-0.1	-2.0	-0.9	-4.0	3.1	-5.5	0.7
Memorandum items:							
Real GDP[1]							
High-income countries	2.4	2.2	1.7	-6.8	3.8	-8.3	2.3
Developing countries	4.8	4.4	3.7	-2.4	4.7	-6.7	0.2
Low-income countries	5.4	5.8	5.0	1.0	4.6	-4.4	-0.9
BRICS	5.3	5.3	4.7	-1.7	5.3	-6.6	0.4
World (2010 PPP weights)[2]	3.9	3.6	2.9	-4.1	4.3	-7.3	1.0
World trade volume[3]	5.9	4.0	0.8	-13.4	5.3	-15.3	2.8
Commodity prices[4]							
Oil price	23.3	29.4	-10.2	-47.9	18.8	-42.5	16.9
Non-energy commodity price index	5.5	1.8	-4.2	-5.9	3.0	-6.0	1.3

Source: Adapted from World Bank.[21]

- **Foreign Direct Investment (FDI)**, according to IMF, foreign investors have removed US$ 83 billion from developing countries since the beginning of the COVID-19 crisis-marking the largest capital outflow ever recorded.[22] While UNCTAD suggests that FDI will witness a shrink of 5 to 15 per cent, as compared to the earlier forecasted marginal growth for 2020-2021.[23]

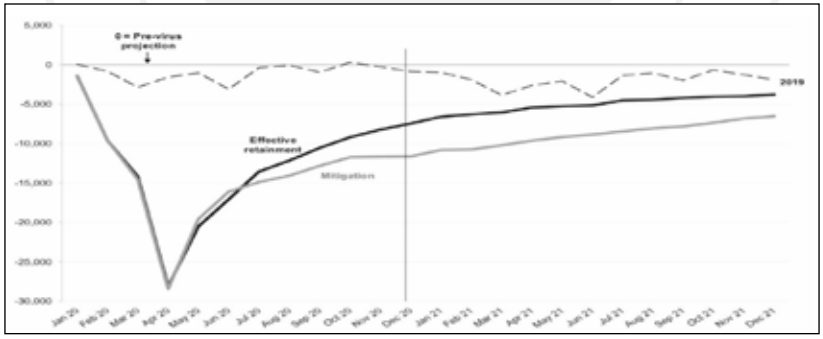
The most affected sectors are mainly: the automotive industry (–44 per cent), airlines (–42 per cent) and energy and basic materials industries (–13 per cent).[24] Apart from manufacturing, travel and tourism sector has also been severely hit as a result of travel bans.

Covid-19 has pushed countries to reduce their dependency on China and its manufacturing industry.

The implications of which will hit developing countries the most. For, the FDI inflows to developing countries are expected to drop even more than the global average as the sectors (noted above) that have been severely impacted account for a larger share of FDI inflows in developing countries.

- **Global Oil Demand,** may shrink by 15-20 mbpd (million barrels per day).[25] Twenty-two[26] economies which consume 78 per cent oil are under the ambit of COVID-19 and advanced economies remain most affected. The combined effect of price-war and COVID-19 resulted in Brent crude price reaching a 17 years low, and is expected to fall below US$ 10/barrel.[27] An analysis by Rystad Energy suggests that by July 2020, global oil demand may recover by close to 15 million bpd since the bottom in April.[28] However, the global oil demand is unlikely to reach 2019 demand level until 2022–23, as noted in Figure 2.

Figure 2: Global Oil Demand Impact Analysis, Changes vs Pre-virus Estimates
(Thousand barrels per day)



Source: Adapted from Rystad Energy.[29]

Global Unemployment, as per International Labour Organization's (ILO) prediction 1.6 billion informal economy workers, comprising nearly half of the global workforce could suffer a 'massive damage' to their livelihoods.[30] Wherein, the second quarter of 2020, could suffer a loss of 305 million full-

time jobs. As compared to the pre-pandemic situation, the global working hours have declined in the first quarter of 2020 by an estimated 4.5 per cent (equivalent to approximately 130 million full-time jobs, assuming a 48-hour working week) to that of the second quarter expected to be 10.5 per cent lower than in the last pre-crisis quarter (equivalent to 305 million full-time job),[31] as noted in Figure 3.

Figure 3: Estimated Drop in Aggregated Working Hours Globally
(based on region and income groups)

Source: Adapted from ILO Monitor.[32]

Note: *Estimated percentage drop in aggregate working hours compared to the pre-crisis baseline (4th quarter 2019, seasonally adjusted).

The other indicator of increasing unemployment is the heightened risks in the enterprises under COVDI-19. Taking together employers and own-account workers, around 436 million enterprises in the hardest-hit sectors worldwide are currently facing high risks of serious disruption, as noted in Table 3.

To note, currently, in G7 the unemployment totals from 30 million in US to 1.76 million in Japan.[34] However, European nations have tackled rise in unemployment by opting for generous wage subsidies over layoffs.

These indicators highlight the long-term implications. With global economy facing a risk of collapse, there is compounded risk of debt vulnerabilities in the low-income countries and the surging global unemployment rate. Therefore, with these global indicators at risk, it can be rightly stated that the impact of COVID-19 is directly proportional to the time the virus takes to be contained. Hence, a long-term dent to be recovered.

Table 3: Impact on Enterprises (employers and own-account workers) in Hardest Hit Sectors

Economic sector	Impact of crisis on economic output	Employers (millions)	Own-account workers (millions)	Share of own-account workers in total employment (%)	Share of employed in firms with 2–9 employees in total employment (%)	Share of employed in firms with 10+ employees in total employment (%)
Wholesale and retail trade; repair of motor vehicles and motorcycles	High	21	211	45	25	30
Manufacturing	High	12	99	19	15	66
Accommodation and food services	High	7	44	29	29	41
Real estate; business and administrative activities	High	7	35	21	23	56
Arts, entertainment and recreation, and other services	Medium-high	4	57	30	31	39
Transport, storage and communication	Medium-high	4	76	31	19	50
Construction	Medium	9	103	38	26	36
Financial and insurance services	Medium	1	3	6	11	83
Mining and quarrying	Medium	<1	3	28	14	58
Agriculture, forestry and fishing	Low-medium	19	470	55	30	15
Human health and social work activities	Low	2	11	7	14	79
Education	Low	1	7	5	14	81
Utilities	Low	<1	3	10	13	77
Public administration and defence; compulsory social security	Low	<1	0	2	8	90

Source: Adapted from ILO Monitor[33]

Major Strategic Trends to Expect: Shifts at Play

As the global indicators witness increasing risks, it is also indicative of the severe challenges posed by COVID-19 to the existing international order—resulting into a global disorder. Wherein, the strategic shifts are calling in a new global order, defined as the 'post-COVID world order'. The likely outcome of the strategic shifts can be posited as follows:

- **China losing its 'World Factory' status:** As Wuhan epidemic led to close down of production in China, followed by travel bans, it severely disrupted the global value and supply chain system. With export-import greatly impacted, COVID-19 has pushed countries to reduce the dependency on China and China's manufacturing. This has resulted in countries planning to shift production out of China.
- **New production hubs against China:** Countries such as Thailand, Bangladesh, Vietnam, India, Taiwan, Cambodia and Philippines are the new 'preferred destinations of foreign business and investments'.

- **An assertive China:** The mounting global pressure on China to undertake an independent investigation of the virus outbreak will have a spiller effect on China becoming assertive in safeguarding its claims. Tensions along South China Sea, East China Sea, India-China border will exhibit an uptick—the signs are already displayed on these fronts.
- **Shaping of New International partnerships:** The Indo-Pacific security architecture is likely to become an active and functional construct. As already noted with the formation of QUAD-Plus (New Zealand, South Korea and Vietnam as the new members) and the Quad Plus video-conference, a weekly meeting, to discuss issues related to COVID-19.
- **An emerging role of India in the global order:** India is likely to take up greater roles as already highlighted in New Delhi, by taking lead with initiating the SAARC Virtual Summit, the G20 Virtual Summit and most notably, assuming chairmanship in the Executive Board of the World Health Association.

Dr. **Amrita Jash** is a Research Fellow at the Centre for Land Warfare Studies (CLAWS), New Delhi. Views expressed are personal.

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Armed Forces Modernisation:
Optimisation is the Key

ASHWANI GUPTA

Preamble

The concept of warfare has undergone a fundamental change in the last three to four decades. Convention warfare has blurred with the capability of armed forces reinforced with nameless adversaries in the form of terrorist groups, print and social media activists, over ground workers, besides diplomatic and economic coercion. The two threats at the forefront—China and Pakistan—are omni-present with an active Line of Control (LoC) and increasing intrusions by China along the Line of Actual Control (LAC). India is constantly at war footing forcing deployment of security forces in J&K due to the volatile border situation with Pakistan and for maintenance of peace and continuous deployment in North-east and LWE affected states. Armed forces face a multitude of threat spectrum and their conventional edge can be maintained but equipping them with modern equipment is a challenge due to fund constraints. Given the resource crunch, the armed forces have to find out-of-the-box solutions to generate funds for modernisation while maintaining boots on ground to thwart any misadventure by either of the two adversaries.

Modernisation versus Force Strength Dilemma

The mandate of the Indian armed forces is to defend the sovereignty and territorial integrity from external aggression. Indian Armed forces have an active strength of 1.4 million with 1.15 reservists. These numbers are supplemented with 1.44 million Central Armed Police Forces (CAPF) soldiers. Maintaining and equipping a large active armed force requires substantial fund allocation. Optimum strength for a worst-case scenario has to be derived and maintained within the available resources. Modern well-equipped armed forces require substantial funding which India with its human development index (HDI) cannot afford and the armed forces will always lose the bullet versus bread debate. Hence, the available rupee in the defence budget has to be stretched to the maximum limit.

Indian Defence Budget of 2020-21 has an outlay of 3.37 lakh crore with 1.18 lakh crore as the capital outlay and 2.18 lakh crore as the revenue outlay. Figure 1[1] shows the graph for projection versus allocation of defence budget. The 2019-20 defence budget allocation had a shortfall of 25 per cent than the projection which states the shortage of funds available for equipment procurement required for modernisation. As the revenue expenditure increases every year, the capital outlay will reduce as Ministry of Defence (MoD) is unlikely to get additional funding due to prioritisation of funds for other development schemes in the country. Besides, it has to either cut down the expenditure or reprioritised procurement plans.

Figure 1: Projection versus Allocation to MoD

Source: Issue Brief: India's Defence Budget 2020-21, published in February 2020 by MP-IDSA, New Delhi.

Pathway to Modernisation

The pathway to modernisation can be executed by multiple actions encompassing a number of stakeholders. Major reforms which redefine threat perception and take into account the capabilities, infrastructure and facilities of navy and air force, and as well as those of CAPFs can result in a lean and modern army. The Indian Army today is actively deployed in J&K at the LoC, for insurgency duties and anti-infiltration grid. A similar deployment along the Sikkim and Arunachal Pradesh border with units in counter-insurgency grid have taken a toll on training on conventional role as major focus is on CI/LC environment.

In present day security environment, re-structuring cannot be limited only to armed forces, CAPFs also must be consolidated and re-grouped.

Promulgation of National Security Policy

A National Security Policy must be promulgated which lays down service responsibilities and priorities. In the present day security environment, the restructuring cannot be limited only to the armed forces. CAPFs must also be cohesively grouped both with the armed forces in the overall national security framework. The security policy must take into account capabilities and responsibilities of each service and most importantly, scale one type of equipment to one service. With proposed air defence command planned to be raised, it will place air defence assets under a single commander likely from the Air force, thus procurement of any air defence equipment must be only through the air force. Besides simplifying procurement by a single agency, it will also reduce wide array of inventory. This aspect can be implemented in administrative requirements like commonality of vehicles and basic equipment. Besides reducing inventory, it will also reduce logistics holding and repair facilities.

Implementing Joint Organisations and Establishments

- The concept of Integrated Commands hinges on synergised response by placing assets of all three services under a single commander. Besides coordinated response, the structures also eliminate duplicity of resources in terms of establishment costs and logistics infrastructure. CAPFs also have to be part of the security matrix. Presently, the three border guarding forces of BSF, ITBP and SSB function under Home Ministry; BSF with 173 battalions, ITBP having 56 battalions and SSB has 73 battalions. BSF guards the western

borders and the Bangladesh border. The borders against China, Nepal and Bhutan presently guarded by ITBP and SSB must be guarded by one force and thus ITBP and SSB should be merged into one entity. It will eliminate a large number of range and frontier headquarters besides co-located command headquarters. However, these organisations with a small force strength are raising new headquarters. ITBP with 56 battalions has raised two command headquarters at Chandigarh and Guwahati for presumably streamlining command and control and coordination of field formations, but in reality it is the result of cadre review which has led to creation of 35 new posts at the rank of commandant and above.[2]

- Formations in one geographical area must have one commander and headquarter. Army formations and ITBP or BSF are co-located at many locations but have parallel chain of communication to their respective headquarters. The present standoff in Ladakh is a classic example where two forces are providing inputs on the same issue to different ministries. The border guarding forces must be re-located from Home Ministry to Ministry of Defence (MoD) for better coordination at all times as in the present-day environment there is a grey line between peace and active hostilities. This reform has to be a top-down implementation from national security perspective and implemented forthwith. It should not be allowed to stagnate or delayed because of a particular cadre or service.

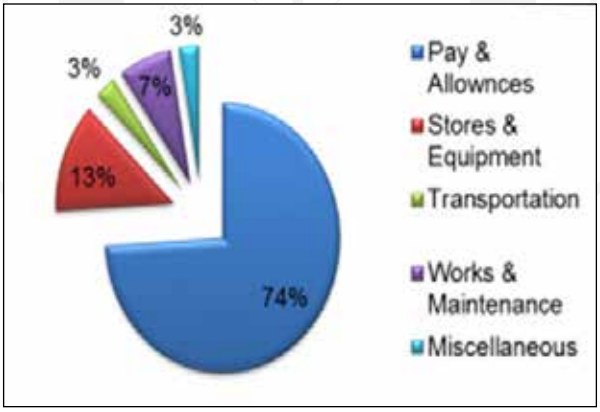
Reducing Revenue Expenditure of the three services is an important step like in the case of the Army which has the highest share of defence budget at 56 per cent, but its capital share has reduced from 26 per cent in 2007-08 to 18 per cent in 2020-21.[3] Navy and Air Force have a much better ratio of revenue versus capital outlay of 46:54 and 41:59 respectively, and their procurement plans fructify in a phased manner compared to the Army. As nearly two-thirds of Army's revenue expenditure is utilised in manpower costs, it is imperative that Army explores ways to scale down its manpower costs to reduce its revenue expenditure. The Indian Army

	Army	Navy	Air Force
Revenue Expenditure (lakh crore)	1.47	0.23	0.30
Capital Expenditure (lakh crore)	0.32	0.27	0.43
Total (lakh crore)	1.79	0.50	0.73
Revenue Expenditure as % of Total	82	46	41
Capital Expenditure as % of Total	18	54	59

has to make a gradual transition from a large low-technology force to a modern high-technology lean force. Optimisation of equipment management and human resources are the key imperatives for reducing revenue expenditure. This can be achieved as follows:

- The Figure 3 shows distribution of Revenue Expenditure[4] of Army for FY 2018-19. One aspect needs to be kept in mind while carrying out the comparison is that Navy and Air Force are platform-centric forces whereas Army is manpower centric, hence its revenue expenditure will always be high. The expenditure estimate shows that out of 74 per cent earmarked for pay and allowances, Army's share is only 61 per cent. Additional 23 per cent is on account of civilian manpower and auxiliary forces.[5] Also, expenditure on infrastructure development like roads, tunnels and ammunition shelters in the Army is paid from the revenue budget, whereas in the Air Force even runway resurfacing is carried out through capital head.[6] Such anomalies need to be streamlined to lay down same guidelines for expenditure and capital outlay for all the three services. In addition, life cycle costs of equipment consume a sizeable portion of the revenue expenditure. Operational and maintenance costs in addition to acquisition costs can be part of capital head to reduce revenue expenditure.

Figure 3: Army Budget Estimates FY 2019-20



Source: Article: Re-Appraisal of Revenue Expenditure of Indian Army- Perception Management. Published in December 2019 by CLAWS, New Delhi.

- **Soldier as a Weapon Platform:** The soldier is a weapon platform for the army as ground has to be physically occupied to prevent enemy ingress. Including a component of the salary of fighting arms in capital head can

Border Guarding Forces of BSF, ITBP and SSB must be placed under MoD with operational control with the Army.

lower the salary component.[7] Army soldiers retire at an early age and a pool of trained and experienced manpower is fretted away without any gainful employment. Besides exploring avenues like lateral placements, increasing the service of soldiers so that they retire at ages of 50 years or beyond in select categories will enable enhanced utilisation. Another component to reduce the manpower costs can be to carry out a comprehensive cadre review for strength reduction and promote a greater percentage to select appointments and ranks from within. Also, a greater short service increment in all ranks, which after three to five years is absorbed in other organisations, will give armed forces the younger rank profile and provide trained and experienced soldiers for CAPFs and police.

- **Incorporating CAPFs in Security Matrix:** Money for modernisation has to come from restructuring manpower requirement. The concept of 'One Force One Task' will provide more battalions for the designated role. Units of ITBP and BSF besides border guarding duties are also deployed in internal security and anti-naxal operations. As CRPF is the designated "Counter-Insurgency Force", only CRPF battalions must be employed in these operations and battalions of ITBP and BSF should only be engaged in border guarding duties. This will provide additional battalions for border guarding duties and help in reducing army units from border guarding role. Further, besides increasing core-competency, it will also remove multiple agencies operating in one area and enable a cohesive response strategy. On similar lines, Rashtriya Rifles can be placed under Home Ministry but maintain its present cadre from the army on lines of Assam Rifles. Also, lateral placement will lead to reduction in numbers besides reducing the pension bill and providing a pool of experienced soldiers to the CAPFs.

Role of Service Headquarters

The service headquarters have a major role to play in deciding the equipment required based on threat perception and modernisation plans. The procurement plans are accordingly structured and prioritised based on funds available. Areas of overlapping jurisdiction like air defence, remote surveillance, maritime air operations and operational logistics can be made service specific to avoid duplicity of resources and the piecemeal procurement be avoided.

- **Equipment Procurement Timelines:** A major factor in import of critical defence equipment is the availability and cost appreciation. The foreign vendors have always charged a premium for their equipment resulting in higher import costs. Also, due to the high cost, unsavoury saga of middlemen and political uncertainty, defence procurement has been a subject of scrutiny which has led to delays and even cancellations after protracted negotiations. Equipment procurement timelines have to be fixed to one and three year cycles to obviate a long gestation period. In case, the Defence Research and Development Organisation (DRDO) or the Defence Public Sector Undertakings (DPSU) are not able to develop and deliver within laid down timelines, the product must be shelved and equipment purchased from the foreign vendor.
- **Spearheading Product Development:** The service headquarters have had a very limited role in deciding timelines of equipment development, with DRDO and DPSUs following their own schedules resulting in development cycles running into multiple years. In many cases, induction of equipment has been delayed by over 10 years thus defeating the equipment requirement. DRDO with 67 labs and institutions and DPSUs with 51 entities have been a white elephant consuming almost 10 per cent of the budget but providing low-grade equipment. Assembly of TATA and Ashok Leyland vehicles at Jabalpur highlights the fact that political base of voters is more important than national security. Service Headquarters must drive the timelines and product development and most importantly control product development funds. Participation of private firms is a must, but over the years forced monopoly of DPSUs and DPP provisions did not provide a level playing field to the private vendors which has led to a nascent defence production base. Few success stories like L&T Vajra are a welcome step besides setting up defence corridors. For a powerful armed force, timely availability of quality equipment is a must. To obviate the higher costs and time delays, indigenisation and local procurement of all types of equipment is also necessary, besides removing monopoly of DPSUs.
- Another major hurdle seems to be the varying perception with change of services hierarchy and thus the GSQRs get altered thereby rendering research and developmental work null and void. Lt Gen Surinder Singh in his article, "Military Modernisation in Era of Limited Budgets" commented that 'Army spent huge sums of money on expensive items like the Brahmos, Akash, Heron UAVs which really should have been on the inventory of Air

Force, when what it woefully needed was assault rifles, sniper rifles, anti-tank missiles and protective gear'.[8] The equipment requirement and the GSQRs must be frozen once approved and not changed for a period of five years.

- The service headquarters have an important role to play in equipment management and must also share a segment of culpability for allowing the procurement of unsatisfactory equipment at higher costs. Eighty per cent of equipment of Ordnance Factories (OF) is sourced to the army thus forcing the soldiers to subscribe to outdated technology. The bullet proof helmet built to NATO specifications by an Indian vendor in the Defence Expo in 2014 has not been introduced till date as OFs are a captive supplier through the Department of Defence Procurement (DoDP). The DoDP is a facilitator and should not be the final authority for type of equipment to be purchased. If the DPSUs and OFs cannot produce equipment to the satisfaction of the armed forces, then they must be scaled down or closed.

Conclusion

Indian security apparatus has been impacted due to organisational interests and turf protection between many ministries and services. This has led to multiple agencies working within region each having its own chain of command. There is a requirement of a national security review taking into account the three services and the CAPFs. Given the present budgetary constraints, modernisation plans can fructify by reducing the revenue expenditure which would entail reducing the strength of the standing army. The strength reduction can be obviated by giving a greater role to CAPFs in border guarding duties, but functioning under the control of MoD. Increasing private sector participation in defence production, reducing DPSUs and OFs besides streamlined service-specific procurement with major structural reforms will provide optimum utilisation of funds and commence the transformation to a lean and well-equipped armed forces.

Col **Ashwani Gupta** is former Senior Fellow, CLAWS New Delhi. Views expressed are personal.

Notes

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SCHOLAR WARRIOR

SECTION II

REGIONAL NEIGHBOURHOOD

CENTRE FOR LAND WARFARE STUDIES

China's 2020 Aggression and Indian Response

PC KATOCH

China's 'Tian Xia' (Under the Heaven) concept attributes 'all territories' under the sun to China. The Communist Party of China (CPC) has deliberately planted this idea to cover Chinese actions over a century of so-called humiliation. China's global cartographic aggression is without parallel-claiming territories of over 20 nations, latest being Vladivostok. In 2005, PLAAF's Lt Gen Lin Yazhou said, "When a nation grows strong enough, it practices hegemony. The sole purpose of power is to pursue power. Geography is destiny … When a country begins to rise, it shall first set itself in an invincible position". Western scholars had warned that, China will start flexing its muscles from the beginning of 2010 and if India didn't settle its border with China by then, it would face problems. But despite sustained dialogue, it became apparent that, China was not interested in border resolution because of its insatiable hunger for more territory.

China's 2020 aggression in Eastern Ladakh was deliberate, and was even rehearsed on a detailed life-size model. The unprecedented vicious attack on an Indian patrol on June 15, 2020, in the Galwan area, was pre-meditated. Multiple reasons assigned to Chinese intrusions include weakening economy, internal dissent with rising unemployment, global anger against China for the COVID-19 crisis and the Indian map of Union Territory Ladakh that included Aksai Chin. China does not expect India invading Aksai Chin in the foreseeable future given the military asymmetry but it wants to keep slicing Indian territory especially where it has strategic interests to further operations in future. China also wants India to kowtow to a China-led Asia. Presently, the disengagement process is on in Eastern Ladakh. Although PLA's sincerity is

yet to be seen, but India will have to be prepared for fresh hostilities by China in the future with little warning. What should be India's response is discussed in the succeeding paragraphs, preceded by the prerequisite of much needed internal balancing.

Internal Balancing

Our inability to manage social change and politics of caste, creed, religion, reservations coupled with economic inequality and unchecked population growth provides a ready asymmetrical battlefield to our enemies. We need to shed reactive-defensive policies to counter terrorism. Sri Lanka rid itself of the most vicious terrorist organisation—LTTE, which also had air and naval wings. With the Chinese presence in Sri Lanka, the US, Russia, UK and others today are vying for influencing Sri Lanka. We don't have to follow similar tactics but de-radicalisation and political consolidation of Kashmir must be speeded up. Number of terrorists killed should be seen in the context of 30,000 plus *madrasas* in Pakistan producing hundred thousand radicals annually plus terrorists recruiting youth for jihad in schools and colleges. A defensive policy therefore can carry on endlessly. We need to settle ex-servicemen all along the LOC. Similarly, we must reclaim the tribal corridor in Dandakaranya and developing northeast must be on strategic priority, not linked to sparse population and representation in Parliament.

- **Military**
  - **Rightsizing the Army:** Our emphasis has been to 'downsize' the Army-reduction by about 1,00,000 soldiers, in the absence of a Strategic Defence Review (SDR) and a National Security Strategy. View this in context of the division responsible for Eastern Ladakh which has a frontage of some 800 kilometres with one brigade feeding the Northern Glacier battalion, thus implying that two battalions are away at any one time. Manpower at premium may be supplemented by technology (which is yet to be made available) but still wouldn't suffice with such large frontages in mountains considering movement, time and paucity of reserves. Therefore, a holistic SDR is an absolute must. Any formation must be provided the wherewithal to fulfil its operational task.
  - **Border Management:** The Kargil Review Committee (KRC) and follow-up Group of Ministers (GoMs), headed by the Deputy Prime Minister, had recommended that Central Armed Police Force (CAPF) can be deployed on the border to assist the Army, but must be placed under

India must merge ITBP, BSF and SSB in Border Guards to assist the Army.

the command of the Army. The ITBP deployed in the forefront of Eastern Ladakh is still not under the Army's command, which creates operational problems. India needs to merge the ITBP, BSF and Seema Suraksha Bal (SSB) into 'Border Guards' to assist the Army, making the latter responsible for international borders. This should also be related to China's emerging conventional and sub-conventional threat via Nepal. Unity of command must be imperative on international borders.

- **Hard Power:** Both China and Pakistan understand power. Soft Power has no value without Hard Power. While Soft Power 'softens' blow of Hard Power for the recipient, both Soft and Hard Power must be employed in tandem. Hybrid Warfare is now the preferred form of conflict, which India has not fully acknowledged. We need a road map for building hard power holistically with a time-table, plugging operational gaps on priority. Capacity building must accommodate the full spectrum of conflict, mediums and technologies that provide asymmetric edge. For example, China has synergised cyber warfare with electromagnetic operations. In 2010, INSAT-4B was cyber attacked. IAF lost a Sukhoi fighter on May 23, 2017, close to the LAC, because of cyber interference with onboard computers. A drone was similarly lost in Doklam area. India must acquire such capability, which is a force multiplier for air defence. Like China's Strategic Support Force, we should examine combining cyber, space, intelligence and Electronic Warfare instead of separate Commands and single-point responsibility of C^4I^2SR within the Army. Military must be integrated in India's cyber warfare program (Army leads in US, China) and in space program—both offensive space control and defensive space control. We also need to focus on quantum communications, hypersonics and unmanned warfare.
- **Offensive versus Defensive Forces:** Using Integrated Battle Groups (IBG) of the Mountain Strike Corps (MSC) and India switching from "deterrence of denial" to "deterrence by punishment", was in the news following Exercise 'Him Vijay' held in Arunachal Pradesh in October 2019. Since 1962, India maintained 'deterrence by denial' using troops to check PLA advance through localised battles. Border areas were devoid of infrastructure to make Chinese advance difficult. But by 2010s, this strategy became inadequate since China leveraged superior border

infrastructure to provoke India with transgressions-intrusions. So we were forced to deploy troops forward linearly, arrayed along the LAC, without adequate defence in depth. Some border posts were reinforced to prevent being overwhelmed by Chinese patrols.

Much territory in India's northeast could have been lost, if in 1987, Army Chief General K Sundarji had not launched Operation 'Chequer Board', to test Indian military response in the Himalayan region. But these benefits were short-lived because of poor border infrastructure. This is being developed now but needs acceleration. Given China's demonstrated aggression, we will need to man the LAC permanently to the best of our ability. We don't hold every inch even in Kashmir against Pakistan but patrolling gaps in defences is not possible without forward deployment, which is being done despite offensive capability. Once enemy takes a vital piece of ground, the price for retaking it becomes much costlier.

We need a mix of 'deterrence by denial' and 'deterrence by punishment against China with MSC held as 'threat in being' till situation demands its use. Creation and posturing of tailor-made offensive forces with status quo at border, with full spectrum quid pro quo capability up the escalatory ladder at the Corps level, is needed. We could look at 'Pocket of Excellence Forces' by developing own variant of 'Assassins Mace' weapons, cyber warfare units, space based C^4I^2SR, and guidance & navigation systems operating in optical, IR and microwave segments for network-centric operations. Andaman and Nicobar should be developed as a strategic spring board and for tourism-cum sea trade.

- **Tiered Defence against China**

  China has made inroads in border villages through smugglers, agents and intelligence operations besides PLA presence in development projects in neighbouring countries. We need a tiered defence against China, which is as follows:

  - First Tier: This tier should be in the enemy backyard; asymmetric approaches in reverse of China's "Unrestricted Warfare" based on military, trans-military and non-military applications, aimed at not only negating China's aggressive moves but also to shape the environment to India's advantage.
  - Second Tier: This tier at LAC should not present a weak front anywhere. Sensitive areas like Depsang and Chumar in Eastern Ladakh could be held

by Ladakh Scouts rather than ITBP. Same should apply along the LAC-Himachal, Sikkim, Arunachal and Meghalaya. Number of scouts units can be reviewed considering their roles at LAC and subsequent fighting to cut off enemy thrust lines if the need arises. This tier must have a foolproof trans-border surveillance.

  - Third Tier: This would comprise second layer of units and subunits supporting deployments along the LAC. It could have a mix of regulars, scouts, home guards, civil defence forces operating in the gaps in addition to network of army patrols. Areas that the PLA could possibly use for third dimension aerial envelopment between second and third tiers or behind third tier, would need to be identified and measures instituted to negate their use.

- **Develop Deep Coalitions:** To counter China-Pakistan hybrid war, India should establish multiple 'Deep Coalitions' without disturbing or building upon existing strategic partnerships. Decision to include nation/group of nations/organisations in individual deep coalition, would depend on the aim of a particular coalition, like: cripple China's aggressive moves by forcing it to look inwards; weaken China-Pakistan nexus; weaken China's gravitational pull in strategic neighbourhood especially Nepal; open India's access to Afghanistan-CAR and Balkanize Pakistan as required, and deter Chinese naval bases in IOR and protect SLOCs—are some examples.
- **Sub-Conventional Operations:** India has a strategic asymmetry vis-à-vis China and Pakistan in the sub-conventional segment. The Armed Forces Special Operations Division is still in infancy, which needs to be expanded and equipped. China is aligned with the Taliban in Afghanistan and beside using Pakistani proxies, is using Nepal's Maoists against India. In Myanmar, China has created proxies in the United Wa State Army (UWSA), Arakan Rohingya Salvation Army (ARSA) and the United Liberation Front of West and Southeast Asia (ULFWSEA). India must shed its inhibitions and become pro-active at sub-conventional level; perpetuate a three-front dilemma through non-contact asymmetric capability and punitive lethal deterrence against Pakistan calling its nuclear bluff, and similarly perpetuate a two-front dilemma for China. Multiple Coalitions should use Special Forces and intelligence agencies as nucleus. Endless opportunities exist in Xinjiang, Tibet, Gilgit-Baltistan, Balochistan, Myanmar and even Nepal.

- **Military Diplomacy:** India is using military diplomacy, but it is nowhere compared to what China practices. This is because the primacy of military has never been accepted in India. Nuances are not elaborated here for want of space, but India needs to examine China's science of strategy and how it employs military diplomacy, adopting what is relevant in the Indian context.
- **Psychological Operations:** Psychological operations are an essential part of Chinese strategy. China targets three sets of population: own population; population of target country/region, and the international community. We should do the same.

Diplomacy and Strategic Partnerships

- **China's Cartographic Aggression:** In response to China's cartographic aggression, India has a strong case to build public perception at home and abroad for reviving the Tibet issue. Enclaves of Minsar near Lake Manasarovar plus Bhutanese enclave of T consists of Darchen, Labrang, etc., near Mount Kailash have historically been used by Indians and Bhutanese for periodic pilgrimage. Mount Kailash is the abode of Lord Shiva in ancient mythology.
- **Strategic Depth of Buddhism:** On July 4, President Ram Nath Kovind inaugurated Dhamma Chakra Day 2020, marking the anniversary of Buddha's First Sermon to his first five ascetic disciples. Dhamma Chakra Day is celebrated by the International Buddhist Confederation (IBC) under aegis of the Union Ministry of Culture. Prime Minister Narendra Modi in his address said that, as the world fights extraordinary challenges, their lasting solutions can come from the ideals of Lord Buddha. He drew attention to the Eightfold paths of Buddha showing the path towards well-being of societies and nations, and stressed the need to connect more people with Buddhist heritage sites.

Strategic Depth is generally related to military operations. But classic conventional wars have been relegated to the past, although not completely. Conventional and ongoing asymmetric wars require enhanced application of smart power. In this backdrop, the concept of strategic depth needs to be viewed in the larger politico-military context; also factoring in sources, from which strategic depth 'draws' strengths, to dissuade enemy attack. Buddhism fits very much into the strategic depth of India, in the same way as it is for Tibetans who do not consider themselves as part of China. This strategic depth lies in nations following Buddhism or in countries that have sizeable population of Buddhists, like Cambodia, Thailand, Myanmar, Bhutan, Sri Lanka, Japan and Tibet.

Even a country like Spain where only 300,000 practicing Buddhism, forms part of the 47,370,542 Spanish population, Spain's national court approved indictment of Hu Jintao, former Chinese President, in investigation into China's torture and repression of Tibetans. In December 2018, US President Donald Trump signed into law 'Reciprocal Access to Tibet Act of 2018' which provides access for diplomats, officials, journalists and others from the United States to China's Tibetan areas. In May 2020, US lawmaker Scott Perry, introduced a bill recognising Tibet as a separate and independent country. The bill has been sent to the White House for approval by President Trump. India must optimise the strategic depth of Buddhism.

- **Taiwan:** Nations are calling to remove China from UNHCR. Removing a P5 member from UNSC is unheard of but ROC (Taiwan) was replaced by PRC (China) through the UNGA. If China continues to be a threat to humanity, its removal from UNSC is worth examining, even though eventually Russia will need to be brought on board. With China blatantly abusing Indian territories, it is about time we establish diplomatic relations with Taiwan. It would be good for the US to provide nuclear capability to Taiwan and we should supply BrahMos missiles to Taiwan.
- **String of Pearls:** India is countering China's 'String of Pearls' through the 'Act East Policy', investing in Iran's Chabahar port and by developing Indo-Pacific alliance with Japan and USA, in addition to developing relations with Mongolia, Vietnam and other Southeast Asian countries like Singapore. This needs to be boosted in addition to weakening the string of pearls and growing Chinese influence in Nepal, Myanmar and Bangladesh. India should also support the democratic movement in Hong Kong at least through non-governmental organisations and condemn China's human rights violations in Tibet, Xinjiang and Hong Kong.
- **Quad:** India has invited Australia for the next naval exercise in the Bay of Bengal. Quad must signal to China the resolve to keep the Indo-Pacific free from China's interference in freedom of navigation, shared values of global commons and economic development, which cannot be dominated by any country like China. Expansion of Quad to 'Quad Plus' is a concept that should be worked upon.
- **Collective Response to Chinese Attack:** India does not have a formal military alliance with any country, but there is potential in strategic partnerships and organisations like Quad, to respond to an attack on India

in the form of a non-military alliance where China is the common threat. This can be in the form of cyber-electromagnetic attacks (where the source remains ambiguous) to target China's attacking air and space asserts, in addition to targeting Chinese critical infrastructure, China's offensive against India can also be an opportunity to attack China's economic hubs (BRI-CPEC-CMEC) energy pipelines and overseas assets to punish China for becoming a worldwide menace, that has no respect for humanity and global norms. For the Quad, perpetuating China's Malacca dilemma and Chinese naval assets in the Indo-Pacific would be good targets.

India must form strategic partnerships like Quad to counter any Chinese aggression.

Economic Considerations

Over the years, China had a virtual free run in economic fields of India, because of which decoupling from China is not easy. Moves to boycott Chinese goods and restrict Chinese capital in India are driven by some fundamental concerns: safeguarding national security by reducing Chinese financial and functional presence in strategic sectors like telecom, reducing China's import-driven economic dependence and responding to Chinese aggression in Ladakh. China's export to India during 2018 was only three percent of its overall exports, therefore, total boycott and tariffs won't affect China much. India cannot place a blanket ban on Chinese goods due to WTO but public can individually do so, which would make a difference—for example shunning Chinese smartphones. India has already banned all Chinese apps.

The domestic industry has been sourcing essentials from China for electrical equipment & machinery, mechanical appliances, semi-conductor devices, fertilisers, iron and steel products, coal, auto components, textile fabric, project goods & accessories, and antibiotics. This cannot stop immediately but domestic industry must look for alternative sources, which will not be easy since not many sources may be able to supply required volumes speedily at competitive rates. Indian tariffs on imports from alternative source(s) would increase economic hardships for industry battling with COVID-19. Government will need to ensure affordability by the industry. Union Commerce and Industry Minister has announced that Centre is considering further easing of FDI rules in addition to pushing reforms in mining, banking and capital market. China anyway is not the largest source of FDI in India.

Of concern should be Chinese investments in defence startups. China should not be permitted to invest in the defence sector even by proxy. Same goes for 5G on account of security as Huawei and ZTE are intimately linked to PLA and need to be avoided. Diplomatic and military confrontation with China can hardly be separated from trade and economy. But the Prime Minister's call for *Atmanirbhar Bharat* must be pursued vigorously. This will essentially be a gradual process. While total economic decoupling from China is not possible, dependence on China should continue to be reduced incrementally.

Conclusion

Zbigniew Brzezinski wrote in his book *The Grand Chessboard* published in 1997 that, "China and India are destined by geography to be Rivals. With venerable culture and vast population, are likely to compete with each other for resources and influence". Now that China has shed its mask of peaceful rise, India must respond to a more aggressive China by boosting and applying its comprehensive national power.

Lieutenant General **PC Katoch**, UYSM, AVSM, SC (Retd) is a prolific writer on military issues. Views expressed are personal.

Constraining the Pakistani Military-Jihadi Complex

PRANAY KOTASTHANE

Introduction

The tensions on the Line of Actual Control (LAC) in Ladakh have understandably dominated discussions in the Indian strategic community over the last few months. This focus on China led to the various important developments in the India-Pakistan conflict, being pushed into the background. Even as India responds to the People's Republic of China's (PRC) arrogance, none of the underlying causes of friction between India and Pakistan have reduced in scale or intensity. By June 2020, Pakistan had already violated the ceasefire more than 1400 times, as against 3168 and 1629 in 2019 and 2018 respectively.[1] In June again, two Pakistani envoys were expelled from the Pakistan High Commission in Delhi on charges of spying, which subsequently led to retaliation and escalation from the Pakistani side.[2]

In May, a new terror outfit by the name of 'The Resistance Front' (TRF) surfaced. Primarily made up of past Lashkar-e-Taiba terrorists, this group claimed responsibility for several attacks and firefights after the Government of India scrapped Jammu and Kashmir's special status in August 2019.[3] Finally, Pakistan's domestic mismanagement in its response to COVID-19 and China's incursions, have also increased the possibility of elements in Pakistan ratcheting up tensions with India.

Keeping these recent developments in mind, this paper aims to develop a portfolio of options for India to tackle Pakistan in the short-term. The next section

MJC is a highly interconnected and interdependent organisation, comprising a large number of co-evolving nodes like the armed forces, militant organisations, etc.

outlines a framework to understand Pakistan's actions towards India. Thereafter, each section takes stock of major domestic, international, and regional developments over the past year that can change the risk vectors emanating from Pakistan for India. While discussing each development, specific risks and opportunities for India are outlined. The paper then proceeds to discuss how India can prepare for these risks. Finally, it ends with a discussion on India's capacity to inflict pain on Pakistan.

The Framework

To put recent developments in perspective, it is important to have in mind a conceptual framework that can explicate Pakistan's seemingly duplicitous actions vis-à-vis India and the world. The framework used in this paper imagines Pakistan as not one geopolitical entity, but two. The first is a 'putative state' which has all the paraphernalia that gives it a veneer of a normal state. However, this putative state competes with a 'multi-dimensional entity' comprised of military, militant, radical Islamist and political-economic structures that pursues a set of domestic and foreign policies to ensure its own survival and relative dominance– something we refer to as the Military-Jihadi Complex (MJC).[4]

The inability to understand this duality of Pakistan has led to misplaced expectations, confounding outcomes, and failed policies by states and international governments alike.[5] It is this 'other' Pakistan—the MJC—that is the most powerful political decision-maker in Pakistan today. As Nitin Pai has argued, "it exploits Pakistan's geopolitical position to promote its own interests, passing them off—often quite successfully—as Pakistan's national interests, thereby becoming the primary beneficiary of international assistance that ought to have accrued to the people of Pakistan".[6]

Structurally, the MJC is a highly interconnected and interdependent organisation, comprising a large number of co-evolving nodes: the armed forces, militant organisations, socio-religious organisations & networks, charity trusts having deep connections with terrorist networks, organised crime syndicates, for-profit organisations such as the National Logistics Cell (NLC), and even a few political formations. This MJC, as an institutional arrangement, leverages collective resources to achieve a specific objective—no reconciliation with India, which is a self-serving motive. By keeping India's actions tied to Pakistan's destiny,

the MJC has continued to enjoy a comparative advantage over the putative state because it has successfully projected that "corrupt politicians" cannot be relied upon to handle a hostile India.[7]

Given that of the two Pakistans, the MJC determines, directs, and executes the India policy, which is the primary focus of this paper. Every political development in recent months has been assessed in terms of its impact on the MJC—how it increases or decreases the MJC's power domestically, and how it affects the MJC's engagement with India and the world.

To make sense of some recent developments affecting the MJC, a commonly used contingency planning framework is deployed. In this framework, planning for future contingencies involves identification of four factors: developments, risks, preparedness actions, and countermeasures. *Developments* here refer to events encountered by the MJC. A single development can generate multiple *risks* and *opportunities* for the MJC, and hence to India. *Preparedness* actions are proactive steps that India needs to take in advance to mitigate an emerging risk or to exploit an underlying opportunity. Finally, *countermeasures* are reactive steps taken to reduce or contain the impact of a risk once it has begun materialising.[8] From here on, each section in the paper parses one recent development relating to the MJC through the above framework.

Development 1: The MJC's External Benefactors have Changed

This is perhaps the most significant development for the MJC in recent years. In his landmark book *Between Mosque and Military*, Husain Haqqani talks about a policy tripod that sustains the MJC—India as an existential enemy; Islam as the unifying entity; and the US as a chief benefactor. The big change has been in the third leg of this tripod, as the US began rolling back economic and security assistance to Pakistan.

As per the latest Congressional Research Service data, the total assistance from the US to Pakistan had fallen from US$ 2.6 billion in FY 2012 to just US$ 0.1 billion in FY 2018.[9] This change reflects the growth in the US-India relationship on one hand and the relative decline of the US-Pakistan relationship on the other, which is now narrowly focused on the situation in Afghanistan. As a result, the MJC has been in desperate search for another financier. Another candidate for this role, the Kingdom of Saudi Arabia, has failed to compensate for the declining US economic support. Given the backdrop of an economic recession due to

COVID-19, it is unlikely that Saudi Arabia will ramp up its economic assistance to Pakistan in the near future.

This leaves MJC with only one major financier, the PRC. Unlike the US, the PRC is willing to accept the MJC as a legitimate political actor and has no intentions of changing the civil-military power dynamics in Pakistan. Also, unlike the arrangement with the US, its financing in Pakistan is in the form of loans and conditional grants for projects, and not in the form of unconditional cash.

- ***Risks and Opportunities for India***

There are both risks and opportunities arising from the outlined changes in the MJC's financial backers. The most prominent risk is that, since the MJC is dependent on PRC like never before, and both are adversarial to India, therefore, it will continue to hurt Indian interests in order to prove its relevance to the PRC. The risk of the MJC acting in this manner becomes higher if PRC and India are engaged in an overt confrontation like the one along the LAC. The MJC might dial up infiltration and terrorist attacks in the coming months in order to link the India-China clashes in Ladakh to the Kashmir dispute. MJC's efforts projecting that the August 5th decision by India i.e. changing the status of the erstwhile J&K state, is the cause of tensions in Ladakh, are a case in point. Another risk is that, in case of tensions, the MJC and PRC might collaborate to attack India through non-kinetic means. Joint cyber attacks against India or collaborated misinformation efforts to undermine India, are not beyond imagination.

The opportunity for India is that as PRC and MJC come closer, it will be easier to expose the structural flaws in their unequal relationship. As PRC increases its influence in Pakistan's economy, nationalist forces (and even sections of the MJC) are likely to create fault lines between the two countries. There are already murmurs accusing PRC of 'neo-imperialism' and a 'win-loss' arrangement. The lack of transparency in China-Pakistan Economic Corridor (CPEC) will aid such accusations of PRC's extraction of Pakistan's resources. Significant cultural differences between the two countries will continue to remain a source of friction.

- ***India's Preparedness and Countermeasures***

India should be prepared to face a diplomatic offensive of the MJC-PRC combine at various multilateral fora over Kashmir. Closer ties with the US, Japan, Australia and France are important to tackle this offensive. India also needs to be prepared for a rise in infiltration attempts and terrorist activity in Kashmir. As a countermeasure, India's messaging should aim to accentuate the underlying

cultural, social, and economic differences between China and Pakistan in order to reduce the flow of capital from PRC to the MJC. The weaker the MJC's external benefactor, the more constrained it will be. Exposing the PRC's treatment of violence in Xinjiang will also find sympathisers in the MJC.

Development 2: The US-Taliban Peace Agreement

The US President has repeatedly expressed a desire to withdraw troops from Afghanistan ahead of the November 2020 presidential elections.[10] To achieve that goal, the US was also ready to sign a 'humiliating' peace agreement with the Taliban in which the US committed to a full-withdrawal, over 14 months, in exchange for the Taliban's guarantees of not acting against "the US and its allies" in the future and public denouncement of the Islamic State and Al-Qaeda.[11] The MJC has played a major role in steering and pressuring the Afghan-Taliban to sign this agreement. In the process, it managed to partially repair flailing ties with the US. More importantly, it made a major headway in its long-cherished aim of installing a pliant government in Kabul.

- ***Risks and Opportunities for India***

The acceptance of the Taliban as a legitimate political force by the US, is a moral and material victory for the MJC. The US-Taliban peace agreement is a tangible result for its policy of sustained terrorism in Afghanistan. Even a partial withdrawal of the US on the Taliban's—and by extension, the MJC's—terms will reaffirm the MJC's faith in using terrorism as a state policy. It might then apply this lesson to double down on terrorism against India as well. The ascendance of the MJC-backed Taliban is already showing direct consequences for India's presence in Afghanistan. In April this year, the two consulates in Herat and Jalalabad were temporarily closed down on account of the worsening security situation and COVID-19.[12] Further, India's economic and diplomatic footprint will reduce in the short-term. A case in point is the MJC's attempt to designate four Indian nationals in Afghanistan under the UN 1267 Sanctions List, accusing them of spreading terrorism in Pakistan.[13] Another risk is the MJC relocating its terror networks to Loya Paktia in eastern Afghanistan, which was a hotbed of anti-India activities in the past. This would allow the MJC to use terrorism against India while claiming that it has driven terrorists out of Pakistan.

The long-term opportunity for India is that as the US reduces its presence, Pakistan will be left with the unenviable task of managing the volatile situation in Afghanistan. It will be drawn into the seemingly irreconcilable differences

in the Afghanistan polity. If a civil war-like situation erupts, the MJC will be left with more problems in its hands. Moreover, the Taliban itself has been a difficult stakeholder for Pakistan to manage in the past. Despite the MJC supplanting the Haqqani Network inside the Taliban, the MJC will find it difficult to get concessions from the Taliban on the Durand Line.

- ***Preparedness and Countermeasures***

India needs to be prepared for a scenario in which the MJC attempts to eliminate all Indian presence in Afghanistan. India must act to help its friends, not just in north Afghanistan but also among the anti-Taliban forces in the south. It is time for India to extend capacity-building in the security domain. One possibility is assisting the Afghan National Police (ANP) and the Afghanistan National Defense and Security Forces (ANDSF) in more substantive ways such as conducting training courses on Afghan soil and sharing lessons from our counter-insurgency experience.[14] At the same time, India would need to look at opening links, if not already done, with sections of the Taliban that do not want to be beholden to the MJC's control. Finally, India's focus in Afghanistan, over the long-term should shift towards eliminating Pakistan-backed terrorist outfits' relocation to eastern Afghanistan.

Development 3: India's Revocation of the Special Status of Jammu and Kashmir

On August 5, 2019, the Government of India revoked the special status granted to Jammu and Kashmir under Article 370 of the Constitution. Further, the erstwhile J&K state was divided into two new Union Territories. This move has led to a volatile security situation in J&K abetted by the MJC, exacerbated by the absence of legitimate political channels, a weak economic infrastructure, and inadequate administrative capacity. Given how invested the MJC has been in fomenting trouble in J&K, it is unlikely to take this move lying down. Any action in Kashmir will help the MJC to prove its relevance to the Pakistani society in the short-term. Hence, it would be eager to use this situation to further destabilise J&K and spread unrest elsewhere in India citing India's move as the reason. While it was anticipated that the summer months of 2020 would be when the MJC would strike back in Kashmir, that didn't materialise. While the jury is still out on whether this was due to COVID-19 or due to India's better preparedness, underlying national security risks to India still remain.

- ***Risks and Opportunities for India***

The MJC is likely to continue with its policy of abetment of civil disobedience and violent protests. It will continue to support cross-border terrorism and might even resume a new insurgency against the Indian State by creating new outfits. The MJC would also want to revive insurgencies in other parts of India. Finally, India will face diplomatic offensive from PRC and Pakistan in the coming months over this move.

The opportunity for India arising out of this development, is a chance to change the nature of the social contract of Kashmiris with the Indian state once and for all. Previous attempts at growth and prosperity in Kashmir, were opposed by fundamentalists who saw these as attempts to change the demographic character of the Kashmir valley. The change in the special status of J&K allows India to ignore such calls and bring economic opportunities to Kashmir.

- ***Preparedness and Countermeasures***

In order to reduce the MJC's ability to disrupt events in Kashmir, India needs to overcome the trust deficit that exists with Kashmiris, which has arguably increased because of the abrogation of Article 370 and the communication blockade that has continued since then. Here are a few measures that India can take to prepare for the MJC's attempts to foment trouble in Kashmir. Most of these do not address the MJC directly but are aimed at reducing the support that the MJC might enjoy in Kashmir.[15]

- First, India needs to shift to a surgical and "smart" Armed Forces Special Powers Act (AFSPA) approach whose provisions can be limited in time and space. A change in the AFSPA will signal New Delhi's bona fides and invite Kashmiri political leaders to reciprocate.
- Second, the Government of India should opt for a marginal and not maximal response. It should reverse the damage done to the morale of the J&K Police. It should lift the communications blockade and allow public protests and demonstrations to resume as these outlets are key to reducing the importance of the MJC as the prime influencer.
- Third, India can consider deploying a Special Task Force of highly capable middle level civil servants from across India, for a period of three years to restore broken governance delivery systems.

With COVID-19, the tourism economy of Kashmir has been severely hit. This could make the young more vulnerable to the MJC's machinations. Hence, it is

important for India to find livelihood alternatives. One way to do that is to create Priority Development Areas for the promotion of agro processing, premium bottled water, and premium handicrafts. In the Jammu plains, the government could invite investors in contract farming. Bringing in international expertise in this place, would also be a positive step.

Next, India needs to develop a strategic communication plan to defeat false and competing narratives generated by the MJC. Finally, conducting local and assembly elections, in the medium term, to restart the political machinery and reverting J&K to a full state under the Republic of India after announcing elections, will take off the edge from the MJC's misinformation campaigns.

As a direct countermeasure, India should draw the world's attention to the atrocities the MJC has unleashed in FATA. The Pashtun Tahafuz Movement (PTM)—a protest movement—poses a unique challenge to the MJC because of its mass support base and a non-violent character. This movement has the potential to seriously challenge the MJC and India's efforts in Pakistan should be to align with the Pashtun cause. The Baloch insurgency by itself is too weak to change the power equations in Islamabad.

Development 4: Pakistan's Economic Downturn

Pakistan's economic situation has declined over the last few years. The Pakistan Economic Survey estimates that the economy will shrink by minus 0.38 per cent in FY20. At the same time, the survey estimates the rate of inflation to be 11 per cent.[16] The survey further says, "the fundamental weaknesses of Pakistani economy: low tax to GDP ratio, poor savings rate and minimal export growth with negligible value addition, etc., were further attenuated by misaligned economic policies like loose monetary policy and overvalued exchange rate which have made it difficult to control twin deficits; the fiscal and the current account".[17] This weak domestic economy, coupled with the MJC's diminished inability to extract from its external benefactors, also affects the MJC's fortunes. It is now forced to look inwards and corner more resources for itself.

- ***Risks and Opportunities for India***

A weakened economy reduces the range of options available to the MJC and makes some of its elements risk-averse. This means that the MJC will continue to rely on low-cost asymmetric options such as terrorism to hurt India. Abetting and sponsoring terrorism in areas with active insurgencies, both in Afghanistan and India, are likely to continue.

The opportunity for India is that, a weak economy puts the MJC squarely against forces opposed to it. For instance, the Pakistani Army has been opposing a reform for fair division of fiscal resources between the federal and provincial governments.[18] This offers an opportunity for India because this fight over economic resources has a powerful ethnic dimension. Sindh, Khyber Pakhtunkhwa, and Balochistan—all three provinces that stood to gain from the 18th constitutional amendment, see this controversy as another attempt by the overwhelmingly Punjabi-Pakistani Army to amass resources at their cost.

To further constrain the MJC, India should utilise the FATF mechanism and press upon the member countries that, Pakistan still remains a hotbed of institutionalised terror activity.

- ***Preparedness and Countermeasures***

Whenever the MJC's popularity declines in Pakistan, tensions with India allow it to regain lost ground. So, India should be prepared to face new asymmetric warfare attempts. To further constrain the MJC, India should utilise the FATF mechanism and press upon the member countries that, Pakistan still remains a hotbed of institutionalised terror activity. FATF greylisting will make capital inflows difficult in an already investment-starved economy.[19]

Finally, studies to expose how the MJC corners economic resources of the Pakistani state, might also help manufacture a public opinion within Pakistan that questions the MJC. The lynchpin of the MJC, the Pakistani Army, is still the most trusted institution in Pakistan. To get the two Pakistans to lock horns with each other, public narrative needs to be built exposing the extractive nature of the MJC.

Discussion

This paper surveyed some major developments involving the MJC in the recent months and analysed the risks and opportunities for India arising from them. It proposed some measures to constrain the MJC in the short and medium terms. However, it should be noted that the extent to which India can deploy these options are limited by its own domestic situations. First, a weak economy means that India will become cautious in exercising options that demand considerable resources. Second, the communally-charged domestic narrative that the Citizenship Amendment Act has unleashed, allows the MJC

to reciprocally exploit fissures in the Indian society. Conversely, a fast-growing economy and a stable, peaceful society will allow India to exploit a wider range of options to tackle the MJC. Finally, the MJC is an implacable strategic adversary that India needs to constrain in the short-term and destroy in the long-term.

Mr. **Pranay Kotasthane** is a fellow and faculty at the Takshashila Institution, an independent centre for research and education in public policy. Views expressed are personal.

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Countering Chinese Tanks in the Himalayas

KJ SINGH

Introduction

Satellite imagery has picked up a large build up of Chinese armour, medium and light tanks along with other associated mechanised equipment, in close proximity to the Line of Actual Control (LAC). It is the operationalisation of People's Liberation Army's (PLA) concept based on leveraging utilisation of armour, which has been practiced in mechanised exercises, in recent years. Manoeuvre in last few years, have included heavy drop of armoured vehicles, simulating capture of passes and lightly held areas in high altitude. There are reports that 6 Highland Mechanised Infantry Divisions and 4 Highland Motorised Infantry Divisions have deployed assorted Armoured Fighting Vehicles (AFVs)—medium and light-tanks all across, particularly in Depsang plains, to project their coercive messaging potential, as part of a psychological warfare. At the outset, it will be appropriate to categorically state that India has adequate forces including mechanised elements in prepared and trained state, to not only take care of this threat but even cause criticalities for Chinese. However, PLA has more versatility in their fleet especially due to the introduction of light tank, ZTQ, first fielded during the Doklam crisis. Our BMP-2s, ICVs with a mix of medium tanks, can be adapted for similar application but to a limited extent for relevant tasks. The Chinese threat, which, in all likelihood, will be stemmed but more of such forays can't be ruled out. Hence, it is axiomatic that a review of mechanised fleet be carried

out to make it more versatile and relevant to such challenges in the Himalayan sector, which are likely to recur in future also.

Scope

This article seeks to offer options to enhance versatility of our mechanised fleet in high altitude areas. The focus is primarily confined to recommending optimum mix of mechanised equipment.

Comparative Analysis with PLA Equipment Profile

Six Highland Mechanised Infantry Division and 4 Highland Motorised Infantry Divisions have 2 Mechanised Infantry Regiments (Brigade sized formations) and an armoured regiment. Each Mechanised Infantry Regiment has 4 mechanised battalions. It has combat support elements—artillery, air defence regiments supported by engineers, EW and CBRN defence battalions. Division has reconnaissance battalion equipped with 18 ZBD-04A infantry fighting vehicles armed with ATGMs. Artillery and Air Defence and most other combat-support equipment are tracked. Other associated equipment like helicopters, drones and rocket artillery are grouped as per tasking.

PLA medium tank battalions are equipped with 35 ZTZ-99A (Type 99) tanks or earlier versions like Type 96. Each battalion has 3 tank companies of 11 tanks each with two command tanks. Chinese tanks follow an evolutionary approach and are reverse engineered from original Russian variants and produced by China North Industries Corporation (NORINCO). Their numbering has a psychological hype attached, as exemplified in T-54 clone referred to as Type-59 and T-90 copy as Type-99. The current lot of medium tanks have weight ranging around 55 tonnes, 125 mm smooth bore guns and 1000 to 1200 HP engines. Our medium tanks, T-90s and T-72, in right combination, are more than a match for these tanks. It is pertinent to highlight that numerically four of our regiments can match five Chinese regiments, as we hold nearly 50 armoured vehicles in our regiments. However, our mainstay i.e. T-72, needs to be equipped with an upgraded power pack. Additional power is required to compensate for de-rating of engines by approximately 25 per cent in high altitude areas. Although Russian tanks are customised to operate in extreme cold climates, but some value additions like Auxiliary Power Unit (APUs) have been flagged, as part of ongoing modernisation including creating an ecosystem of heated garages, which need to be fast tracked.

The PLA's mechanised infantry is a mix of tracked Type 86 ICVs wheeled WZ-551 APCs (6x6) and limited number of more contemporary VN-1 (8x8)

PLA's ZTQ-15 is a hybrid light medium tank with 34 tonne weight but has been projected as a game changer for quick reaction forces.

ATGM carriers with Red Arrow missiles. Our BMP-2s are more than a match to PLA ICVs. It is being seen that the PLA infantry has got used to being transported and is in largely motorised mode. Although we enjoy marginal edge in our ICVs, yet modernisation in terms of upgradation of power pack is a critical requirement for operation in high altitude terrain. While we have our own philosophy in utilisation of infantry yet the need is to give them some protection and mobility in the form of mechanised/motorised infantry.

PLA Light Tanks

China has added considerable versatility to its mechanised fleet by fielding a light tank, ZTQ-15 also referred to as Type 15 or Xinquingtan. This tank, though hyped as a game changer, is neither a replacement for medium tanks nor panacea. It is essentially hybrid lighter medium tank with weight of around 34 tonnes. However, it has been utilised in heavy droppings, giving it an edge for utilisation in quick reaction forces. This tank was introduced in 2017 and 40 tanks has been supplied to Bangladesh, with 140 more in the pipeline. The main features of this tank are the 105 mm rifled guns and 1000 HP engine. Although, classically, light tanks are generally in sub 30-tonne class, but ideally are 25 tonnes, with power to weight ratio between 30 and 35. Type-15 has been fitted with extra wide tracks to offset additional weight and reduce Nominal Ground Pressure (NGP), a key enabler for agility and trafficability in marginal terrain. In keeping with evolutionary design, this tank is a replacement for antiquated Type-62 tanks.

As is well known, we currently don't have a light tank on our inventory. Historically, light tanks had a defining and iconic role in 1947 operations, when Stuart tanks were inducted across Zoji La to stem raiders. AMX-13 were again utilised in Chusul during the 1962 war. We had Stuarts, Shermans, AMX-13 and assorted armoured cars till 1970s. Russian PT-76 tanks, replacement of older light tanks, proved their mettle in 1971 operations. Tanks of 63 Cavalry raced to Dhaka after crossing Meghna and other rivers. In 1947, 1965 and 1971 operations, they proved their relevance and were even pitted against medium tanks. Light tanks have their utility in reconnaissance, scouting and out of area contingencies including peacekeeping operations. They can also be utilised in riverine, creeks/marshy backwaters, island territories and coastal areas besides high altitude terrain. Light tanks, if applied audaciously and with imagination for

reconnaissance in force, can open up possibility for Quid Pro Quo (QPQ) operations.

Indian light tank can be indigenously developed on K-9 Vajra chasis.

After de-induction of PT-76 tanks in 1989, half-hearted attempts to find its replacement were made including trials of Brazilian Urutau; British Scorpion and French light tank in the late 1980s. Formalised RFI for 200 wheeled and 100 tracked light tanks was promulgated again in 2009 as a part of the build up for Mountain Strike Corps. Major specifications were 22 tonnes with gun calibre between 105 to 120 mm. Wheeled variant was to be 8x8 or 6x6 in configuration. However, this RFI was retracted. Concurrently, DRDO has experimented with certain variants, utilising BMP chassis with 105 mm gun as also French GIAT TS-90 chassis. Even certain private manufacturers and DPSUs/Ordnance factories have produced prototypes in both wheeled and tracked versions. However, they have not found much traction.

We need to firm up our requirements like air portability, strategic mobility, agility and put numerical template. A tank of around 25-30 tonnes with power to weight ratio of 30:35 and gun calibre of 105-120 mm with missile firing and modern optronics. It could later be upgraded with Active Protection System (APS). One possible option is to utilise K-9 Vajra chassis of recently introduced self-propelled gun system in collaboration with Koreans. Tracked version with high-grade track shoes to minimise damage to roads, will be a preferred option.

Support Equipment

Our Armoured cars—Skots, Daimler and Nissan were in vanguard in Katanga UN peacekeeping operations in the 1960s and later in counter-insurgency operations in North East besides being utilised in parts of J&K. One of the widely proliferated images of the ongoing standoff has been the Chinese using Humvee type of patrol cars. Yet, we have chosen to eliminate light tanks and armoured cars, from our arsenal. On the other hand, they form critical part of most modern armies. The primary justification has been budgetary constraints, especially in the last decade. Naturally the guillotine fell on cost-intensive platforms. The dominant thought has been 'one size fits all' and heavier the better.

Our mainstay—the Infantry—has been denied the much needed protection in stark contrast with PLA, which is utilising motorised and mechanised platforms in great abundance. Ideally, infantry should have some proportion of lightly armoured, highly agile vehicles for quick reaction teams, reconnaissance and commanders. Proposal for bullet proof, high mobility vehicles was dropped in 2012, despite multiple screening and demand from the other two services. Considering that it

takes six to seven years for proposals to fructify, we are already late. This proposal was revived later and is now in the advanced stage. Interestingly, it was shot down on specious grounds that was once mounted i.e. infantry would lose orientation, which is a gross under estimation of their resilience as an infantry soldier is able to adapt to all kinds of challenges.

Common chassis for support equipment and developing a family of vehicles coupled with ecosystem for retrofitting and modernisation, is the need of hour to reduce complexities in logistics. Make or Made in India route with partners like South Korea, Vietnam and like-minded countries can make this project viable. Indians can act as integrators with work shared with partners.

Summary of Recommendations

The first and foremost requirement is to build a versatile family of armoured vehicles with optimum mix of medium and light tanks with customised support equipments. Consequently, there is an urgent need to fast track the development process for light tanks. Second, we need to find partners and achieve indigenisation. Third, existing fleet of medium tanks in high altitude areas needs to be modernised, most importantly by upgrading their power packs. Fourth, ageing ICVs should be given the much needed upgradation package including power pack and better protection system. Fifth, an ecosystem for training and sustenance should be set up in these areas. Sixth, the infantry should be provided with protected high mobility vehicles. Seventh, commonality of platform should be attempted to reduce logistical challenges.

Conclusion

Finally, notwithstanding Chinese muscle flexing, it is men behind the gun, who make the vital difference. Our tank crews have shown their grit, in ample measure during operations and most notable was the overcoming of vast disparity between Pakistani Patton and our ageing Centurions in 1965. The need to train and establish infrastructure for realistic training in terms of ranges and simulators is critical. Repair hubs for in situ medium repairs, overhaul and heated garages should also form part of mechanised ecosystem in high altitude areas. While we are capable of tiding over this crisis, the need for capability building and renewed focus of light tanks has been highlighted, meriting expeditious action.

Lieutenant General **KJ Singh**, PVSM, AVSM & Bar (Retd) is former GOC-in-C Western Command. Views expressed are personal.

Enhancing the Strategic Petroleum Reserves:
A Significant Player in India's Energy Security Ambitions

VISHAKH KRISHNAN VALIATHAN

Energy is the basis of industrial society. And of all the energy sources, oil has loomed the largest and the most problematic because of its central role, its strategic character, its geographic distribution, the recurrent pattern of crisis in its supply- and the inevitable and irresistible temptation to grasp for its rewards.

—Daniel Yergin[1]

Introduction

The evolution of man, inventions and innovations in science and technology along with research and development over centuries have become integral to the economic activities of the present day. Energy has evolved as a predominant sector in which nations have been investing for decades. In various stages of history, traditional sources of energy, like coal, were used and the revolution began when a new source arrived, that is, the oil. The discovery of oil stood out as one of the most strategic inventions in human and economic history. The advent of crude oil revolutionised the industrial sector with its multiple by-products, including petrol and diesel, in the market.

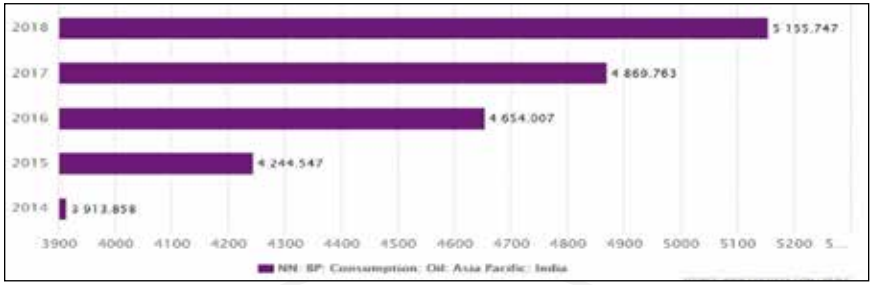
Discovery of oil is one of the most strategic inventions in human and economic history.

Over the last century, oil has turned out to be the world's biggest and most pervasive business sector that changed the fate of many nations. Oil is pivotal to security, wealth, prosperity and the very nature of civilisation. This commodity is strategic and is intertwined with national strategies and global power politics. Oil, many times became the face of global conflicts. Interestingly, the Arab world and the Persian Gulf is home to the bulk of the planet's oil resources.[2] The competition on control of oil and domination by international companies and developing countries, during the Cold War days, led to fluctuation in pricing mechanism, and further to the formation of an organisation, with shared interests on oil, which was later called Organisation of Petroleum Exporting Countries (OPEC).[3] Oil transformed the modern way of living as it has created a situation where society is highly dependent on it. Countries like China and India, with the largest populations in the world, have become the major consumers of oil and gas in recent times.[4] Being an emerging economy, India cannot always rely on oil imports, especially during an unexpected crisis, so by and large the need for Strategic Petroleum Reserves (SPR) persists.

Role of Crude Oil in India's Energy Security Calculus

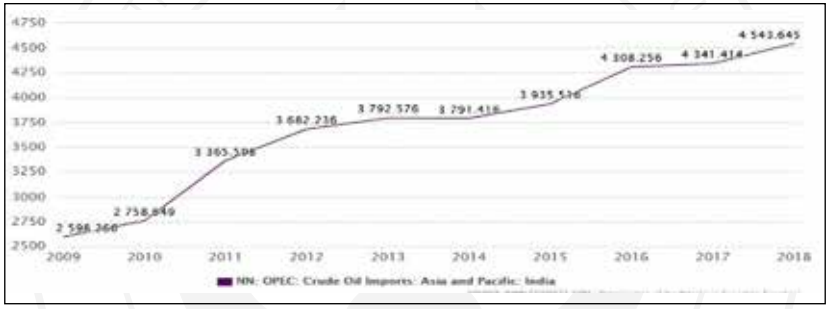
Since the 1990s, with a booming population in Asia, the demand for crude oil and gas is only increasing daily. China and India emerged as major consumers and importers of these energy resources in the last decade, especially importing them from the Middle East. The increasing geopolitical tensions in the Persian Gulf and the fluctuation in crude oil prices has been a concern for the consumer nations. Around 76 per cent of the world's oil trade and approximately just more than 70 per cent of India's oil imports transits via the Strait of Hormuz, which in recent times, has been vulnerable to hostility.[5] Over the years, India's consumption curve has been sliding upwards and its oil demand is expected to reach 6 million barrels per day (MBD) in 2024 from 4.4 MBD in 2017.[6] With a rising decadal population, India is one of the largest consumers of oil in the world–with consumption of around 5156 barrels per day (BPD) in 2018 (Figure 1). India's oil imports constitute around 20.67 per cent of the country's total imports as of October 2019.[7]

Figure 1: India's Oil Consumption (2014–18)



Source: CEIC Data, Greater London, England; https://www.ceicdata.com/en/indicator/india/oil-consumption.

Figure 2: India's Crude Oil Imports (2014–18)



Source: CEIC Data, Greater London, England; https://www.ceicdata.com/en/indicator/india/crude-oil-imports.

With an overwhelming share of oil imports from the Persian Gulf, India accounts for more than 83 per cent of import dependency from the West Asian region.[8] However, India also ships oil from other parts of the world like Venezuela, the United States and Russia. From Figure 2, it is evident that, over the last decade there has been a progressive increase in India's oil imports. Moreover, there has also been an increase in geopolitical tensions across the globe in recent years. The Venezuelan sanctions and later the Iranian oil sanctions in May, forced India to turn towards other oil suppliers by mid-2019.[9] However, India, in the early months of 2019, had purchased higher amounts of oil from both Venezuela and Iran at cheaper prices, however, Iran's oil quality has been a better option for Indian refineries to process.[10] Another issue that India faces with new suppliers is the high transit cost, therefore, adding to the total cost of imports.

India needs to increase its strategic petroleum reserves to deal with global uncertainties.

Apart from this, supply cuts by OPEC and with the increasing proxy attacks in the Arabian waters, India has been vigilant and closely monitoring the tensions in the region. The concern is real, especially when the global economic trade is suffering. The prevailing uncertainty due to the global slowdown has forced the oil-producing nations to divert into other avenues to generate revenue.[11] This would give a push to India to consider the development and upgradation of new locations for its Strategic Petroleum Reserves.

India's Strategic Petroleum Reserves and Opportunities

Energy security is crucial for a developing nation like India with a densely growing population. As India majorly depends on oil imports for meeting its day-to-day needs which seems to be inseparable, the nation also requires to conserve a share of oil as a contingency storage/inventory in facilities which are formally named as strategic oil reserves or Strategic Petroleum Reserves (SPR).[12] This mechanism is followed by many nations apart from the members of Organization for Economic Co-operation and Development (OECD) for whom it was originally designed by International Energy Agency (IAE) as the first of a two-part system to fortify against the supply disruptions by the West Asian nations due to various geo-political threats. These reserves or emergency response measures would be used as standby, which would cater to the internal supply requirements, for a short period, in case of deficiency in imports or an energy crisis.[13] However, in India, the first storage capacity development for a strategic reserve started way back in 2003 in the port city of Visakhapatnam, which was undertaken by the state-run Indian Strategic Petroleum Reserves Limited (ISPRL), a special purpose vehicle under the Oil Industry Development Board (OIDB), Government of India, with the responsibility of constructing storage facilities and managing inventories in 2006.[14]

Being one of the largest consumers of oil, India over the years, have invested in few crude oil storage facilities. Currently, India's Strategic Petroleum Reserves (SPR) which was developed by 2015, is progressively completed and filled at Padur (2.5 MMT), Mangalore in Karnataka (1.5 MMT) and Visakhapatnam in Andhra Pradesh (1.33 MMT) constituting an overall storage capacity of 5.33 MMT in Phase 1, which would only help to run the country for 10 days.[15] Apart from this as seen in Map 1, the government, in 2018, had proposed two more reserves and these facilities would be at Chandikhole in Odisha with a capacity of four

Map 1: Strategic Petroleum Reserves in India (MMT)

Source: Annotated by Author

MMT and expansion of storage capacity of 2.5 MMT again in Padur, which are part of India's SPR Phase 2 filling for 11.5 days. This has enhanced the country's stockpile for consumption to last for approximately 22 days.[16] Interestingly, these facilities are located in ports and also in strategic places, such as caverns, where they can be protected from external attacks and also at places where they can be distributed to major cities in the country with ease—mainly through train connectivity.

With the world experiencing a global economic slowdown, there is an acute realisation among the Indian bureaucratic circles that the current storage is not enough to deal with the uncertainty prevailing due to the supply disruption because of Covid-19 pandemic and also because of the price tussle between Saudi Arabia and Russia amidst the crisis. The fall in crude oil prices to as low as US$ 31 per barrel and even US$ 0 per barrel at a point of time in April 2020, it was an opportunity for the top oil consumers including India to purchase and fill extra reserves.[17,18] However, India's SPR along with the refineries were fully filled as the country was under lockdown since the last week of March 2020.[19]

Interestingly, India does not even have storage for 30 days. Quoting R.S. Sharma, former head of Oil and Natural Gas Corporation Limited (ONGC), "In order to manage contingencies, we need at least a month of strategic petroleum reserves, which was the original plan when the exercise began in 2003".[20] The government plans to first develop a 30-day reserve which is still in process, and eventually extend to 60 days and finally to 90 days. Apart from the existing and proposed storage facilities, the government also plans to initiate two more facilities at Bikaner and Rajkot to reach the target of 30-day storage.[21] Moreover, ISPRL is planning to search for more prospective facilities in the coming year, to have storage availability of at least 90-100 days as backup, which would eventually be used whenever required.

Foreign Interests and Options

For decades India's interest in the Persian Gulf has been centred around its oil imports and diaspora. In 2019, the South Asian economic giant had invited both, the United Arab Emirates (UAE) and Saudi Arabia, to invest in the country by establishing refineries and holding strategic reserves.[22] Interestingly, post the drone attacks on Aramco's oil facilities, Saudi Arabia inked a pact with India to build emergency crude oil reserves, concerning its battle against the volatile crude oil prices in the international market; Indian Strategic Petroleum Reserves Limited and Saudi's Aramco signed a pact to lease a part of the 2.5 million tonnes at Padur's storage facility in Karnataka in 2019.[23]

India is interested in inviting nations to invest in its reserves, while even opening up opportunities in other related ventures. One such opportunity, could be a joint venture between Aramco and ONGC and other Indian companies including Reliance—in which Aramco has already acquired 20 per cent share. This would also give a boost to India's Strategic Partnership. Likewise, India has also signed a pact on crude oil reserves with Abu Dhabi National Oil Company (ADNOC) of UAE, as it has already filled a cavern in Mangalore in 2018.[24] Adding to it, Aramco and its partner—ADNOC—have already signed an agreement, staking 50 per cent in the strategic reserve project and remaining divided among Indian public sector companies—IOC, BPCL and HPCL.[25] Earlier in 2015-16, oil from Iraq and Iran were also used to fill a few caverns in Mangalore.[26]

Importantly, one of the challenges that the subcontinent faces, is the non-availability of adequate energy resources at affordable prices. With OPEC and OPEC+ cutting supplies, the increase in shale oil production by the US in the market, price tussle between Russia and Saudi Arabia in recent times, are signals

to the world economy that there would be no such smooth flow and that it would cater to a fluctuating, volatile pricing mechanism in the coming year.[27] Moreover, the future hike in crude oil prices would be of worry for a developing nation like India, which would gradually lead to higher inflation rates to an already bearish economy while depreciating its currency value as well. Even though the fall of oil prices is short-lived, to manage the prices India could opt for future pricing options in the short run.

With Saudi and UAE agreeing to invest in the country, it is of the nation's interest that if India could accommodate and develop more reserve facilities in the coming year; at the same time even bringing both the oil-producing nations on the table for a pricing contract or currency swapping (already started with UAE), in the short run, could increase supply to India at relatively cheaper prices. Another option for India's energy security could be a collaboration in technology-sharing in oil refineries and allied areas which would, in turn, benefit India in the long run. Moreover, if the 'Petrodollar' and 'Petroyuan' system exists, then being a major importer of oil, it seems that shortly India could initiate a '*Petrorupee*' system for oil-related transactions and assist in purchasing oil to fill its reserves.[28] This would thereby boost India's energy sector, making transactions cheaper, simpler and faster.

Conclusion

For the first time, since its commissioning in 2015-16, India's SPR was at full storage capacity in April 2020. Even when the prices of oil were hitting around US$ 45 to US$ 50 per barrel during 2017-18, ISPRL could not purchase as it had filled halfway through when the prices were around US$ 60 per barrel, just before the fall. In April 2020, with the effect of Covid-19 and the lockdown, the prices went even to single digits which India could have utilised to its benefit in filling its SPRs. However, due to the lockdown, even the refineries were not left with enough storage space. India has to develop more storage facilities to at least fill the gap of 90 days. With the prices slowly shooting up, India might have lost a golden opportunity to purchase more oil at cheap prices. Moreover, the government should speed up the process as well.

South Asia is a rapidly growing region and demand for oil consumption is the highest. Given that, installing more caverns in newly identified locations of India's SPRs would also help in assisting its neighbour countries as and when required. However, to fulfil India's future oil storage, countries that are interested in investing in the country's oil refineries and strategic reserves, must showcase

its trust on the host nation. This would also support India in getting quality oil and attention in the international market. On the contrary, China seems to be getting hold of its SPRs from the major oil-producing nations at cheaper prices. Perhaps it is time that India realises the need for more oil inventories to safeguard the country from future crisis.

Mr. **Vishakh Krishnan Valiathan** is a Research Assistant at the Centre for Land Warfare Studies (CLAWS), New Delhi. Views expressed are personal.

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SCHOLAR WARRIOR

SECTION III

MILITARY TECHNOLOGY

CENTRE FOR LAND WARFARE STUDIES

Impact of Artificial Intelligence in Future Conflicts

ASHMINDER SINGH BAHAL

Introduction

Artificial intelligence (AI) is the simulation of human intelligence in machines that are programmed to think like humans, mimic their actions and exhibit traits like learning, reasoning and problem solving.[1] An artificially intelligent system uses neural networks, which can make connections and reach meanings without relying on pre-defined behavioural algorithms.[2] It is a rapidly growing field of technology, the sheer impact of which on the battlefield is considered as the next revolution in warfare, after the invention of gunpowder and nuclear weapons.[3] AI applications are being incorporated in military processes, operational systems, target recognition sensors, homing devices, autonomous weapons, decision support architecture, training, reconnaissance platforms and offensive/defensive weapons. There is a need, therefore, to evaluate the effect of AI on force employment in conventional wars, multi-domain operations and hybrid warfare.

AI Development in the Subcontinent

President Xi Jinping intends to make China a world leader in AI by 2030 and has placed military innovation at its centre. Chinese AI strategy has already established long-range precision strike capabilities with the integration of AI and cyber capabilities.[4] In order to leverage advantages of AI, they believe that

AI should go beyond robotics and be based on a Human Machine Interface.[5] Currently, they have moved their operational concept of 'Informationalised warfare' to 'Intelligentized warfare'. 'Intelligentization' is a Chinese concept of applying AI's machine speed and processing power to military planning, operational command and decision support.[6] They are likely to use AI to shape a new cognitive domain that leads to a new approach of war fighting.[7] Significant advancement has been made in unmanned platforms, including Wing Loong Unmanned Combat Aerial Vehicles (UCAV), remotely controlled tanks, autonomous amphibious landing vehicles and underwater & helicopter drones.

The side that implements AI successfully can gain operational advantage over opponent.

India's Ministry of Defence (MoD) has recently created a multi-stakeholder task force for Strategic Implementation of AI.[8] The MoD has established a Defence AI Council that guides partnership between the government and the industry. It provides strategic direction towards adoption of AI in defence and envisions formation of the Defence AI Project Agency.[9] The army too has planned constructive (decision support systems) and destructive AI technologies, especially in the mechanised forces.[10] Currently, the forces are working with the Centre for Artificial Intelligence and Robotics, on projects dealing with Multi Agent Robotics Framework, that focuses on image interpretation for target identification and on trajectory analysis for prediction of kill zones (missiles).[11]

AI Applications in Military

Command and Control Systems

The foremost applications of AI are in planning, command & control and decision support systems. Currently, multitude of aircraft, drones, ballistic and cruise missiles, air defence weapons, armoured vehicles, artillery guns, troops, neutral elements, anti-tank/artillery systems and naval platforms may use the same battle space. This increases complexity in planning and decision making. AI simplifies both campaign planning and operational tasking and its integration provides intelligent interface to tri-service networks of command, control and communication. The side that successfully implements AI can become the best and quickest at analysing information, as a result choosing the right option quickly to gain operational advantage faster over its opponent.[12]

It is crucial that the friendly side operates within the Observe Orient Decide Act (OODA) loop of the adversary. Identification of Friend and Foe systems, when linked with accurate data and deep learning, helps in targeting the adversary's elements quickly and reduces the probability of fratricide. AI could assist in undertaking terrain analysis, collating data obtained from different sensors, undertaking data fusion, carrying out threat assessment, helping in target identification, prioritising targets, assigning forces and undertaking mission planning, monitoring and execution.[13] It filters and fuses information to provide integrated situational pictures, thereby facilitating decision making process, whilst shortening the targeting cycle and continuously updating the operational planning process. Thereafter, it helps in quickly predicting the enemy's reactions and own operational solutions so as to remain within the enemy's OODA loop.

AI Technologies in Weapon Systems

A cheap, fully automated system that detects, tracks and engages a human with lethal fire can even be made at home today.[14] In the future, smaller and more powerful processors would be integrated into the soldier's equipment. These advances would help develop robots who could be effectively employed in asymmetric warfare as well as in high intensity conflicts. Lethal Autonomous Weapon Systems (LAWS) searches and engages targets based on programmed constraints whilst operating in different domains; examples include active automated protection systems, like radar guided Close-in Weapon System to defend ships, automated systems for tanks and use of stationary sentry guns that were used in South Korea and Israel.[15]

Unmanned sea systems such as Sea Hunter, are designed to travel underwater for months to search for enemy submarines. Swarms of such elements could be deployed worldwide, that are capable of attacking submarines/surface vessels, in accordance with sophisticated algorithms.[16] China deployed around 12 Sea Wing underwater drones in 2019-20 in the Indian Ocean to undertake hydrographic survey, oceanic research, gather naval intelligence for deep sea mining and aid in future submarine warfare. They may also use these systems to develop artificial islands in the Indian Ocean. That would create severe security issues. There are certain key advantages of using unmanned systems; first their long endurance; second, no loss of life, especially when the system is destroyed; third, ability to maintain high alert status for extended duration and fourth, incredibly high speed of autonomous decision making and action. AI-based target recognition sensors play an important role in discriminating between different targets in

ballistic/cruise missiles and in long-range weapons to enhance precision targeting. AI-enabled recognition sensors could also take into account the enemy's likely behaviour and weather.

AI enabled military robots will proceed ahead of troops to identify ambushes and provide data about target.

AI and Military Robots

Military robots are remotely controlled objects designed for transportation, search & rescue, bomb disposal, mine clearance and fire fighting. American PackBot robot was deployed to trawl the remains after 9/11 attacks, and in 2002 it was used in Afghanistan to deal with improvised explosive devices.[17] In 2005, the US Special Weapons Observation Remote Reconnaissance Direct Action System was the first machine gun equipped robot to see action in Iraq; though mobile, they were kept at fixed locations to defend the perimeters.[18]

Controlled by tablets and utilising deep learning, future robots will proceed ahead of troops to identify IEDs and ambushes and also forward data on targets.[19] These robots will handle combat tasks that include picking off snipers and undertaking target acquisition. They could be deployed in dangerous situations to provide backup during heavy artillery fire, thereby reducing casualties; they could also map a large hostile area by detecting a variety of threats.[20] Their use is likely to increase in conventional warfare to defend outposts during peacetime as well as in sub-conventional warfare, both in rural and urban areas.

AI in Drones/Unmanned Aerial Vehicles

Aerospace technologies have moved from Unmanned Combat Aerial Vehicles (UCAV) to smart drones that have the ability to locate, identify and destroy targets.[21] In the future, large number of stealthy small drones would swarm the adversary's airspace, thereby causing significant damage to its crucial target systems. These cheap drones obviate the need to employ expensive manned fighters, thus bringing in a progressive shift from manned fighters to smart drones that are highly potent in destroying well-defended targets. China has made extensive progress in developing stealthy UCAVs; India is developing AURA, though its pace of development is slow. By 2035, the number of unmanned platforms in the battlefield would be significantly higher and employment of a combination of manned and unmanned platforms would be the norm.

A high degree of situational awareness can be achieved by employing smart drones that fly over a geographically-dispersed contested territory. Supervised learning focuses the drones to discriminate between objects and the algorithms could help identify targets.[22] The large data gathered needs to be stored securely, processed quickly and analysed accurately. Subsequently, meaningful conclusions should be drawn to facilitate quick decision making and to accelerate the targeting process; this process, when facilitated by AI, is akin to machine learning that includes algorithms that help drone—AI combination to learn and improve.

As technology progresses and computing speed improves, the size of drones would reduce and drones would become stealthier and more effective. With deep and super learning, artificial neural networks could be connected in such a manner that the system becomes superior to a human brain. It would gather, collate and process large amount of data and these neural networks would operate much faster than a human brain can ever do whilst simultaneously learning and upgrading itself by interpreting the data patterns and experience that is obtained in the process. The drones would operate autonomously, report on what they have found and if armed, could act on their own in a hunter/killer mode; but, current international understanding prohibits armed attacks without a human "pulling the trigger".[23] Integrating AI technologies completes the 'detection-identification-targeting-destruction-Battle Damage Assessment loop' quickly.

Training and Simulation

Perhaps, the most significant impact AI would make is in simulation and training. Most predictive models simulating battle conditions and outcomes rely on AI-based technologies. The effectiveness of such simulation depends on the reliability of data and probabilities that are fed into the simulation models. In military simulations, there are so many variables—from the use of tanks, infantry, artillery, aircraft, helicopters, ballistic/cruise missiles, satellites to ships and submarines—which utilises different as well as common battle environments, in situations varying from asymmetric to high intensity conflicts, that the use of AI technology becomes essential to derive meaningful learning. The behaviour of entities in such simulations is based on machine learning algorithms that are fed to resolve intricate puzzles and to forecast fuzzy situations.[24] AI-based simulation typically mimics human intelligence relating to reasoning, learning, planning, problem-solving and decision making.[25]

AI in Logistics and Maintenance

In modern warfare, logistics and maintenance play a key role in achieving success as the high intensity battles are resource intensive and requires efficient sustenance of operational effort. Large amount of data needs to be sifted and analysed to make decisions regarding supply, transport & communication of logistics & armament support depending on the field requirements and battle conditions. Using AI and machine learning for logistics and maintenance could make the process agile.[26] AI technologies enable military fleets, ammunition supplies and ordnance depots to identify requirements and predict component failures. Recently, the US Army collaborated with IBM to use its AI platform to pre-identify maintenance issues in Stryker combat vehicles.[27] AI systems could also be used for predictive aircraft maintenance; the USAF is testing AI-enabled systems that tailor maintenance schedules with the needs of an individual aircraft. Similarly, the Army could use AI-based fleet maintenance systems.[28]

Fusion of AI and Cyber Operations in Integrated Battle Spaces for Multi-Domain Operations

The US forces profess Multi-domain Operations (MDO) as a critical capability to defeat near peer adversaries by following tactical concepts of compete, penetrate, disintegrate and exploit, especially to defeat the Chinese Anti Access Area Denial (A2AD) strategy. From platform centric, the operational philosophy gravitates towards fusing platforms over interconnected systems. In the Indian context, the effectiveness of the armed forces would depend on how well the three services and the various systems, belonging to different domains, are integrated seamlessly to bring about a transformative effect of MDO. This multi-domain integration can only take place with the help of AI technologies that result in bringing significant interoperability in the command, control and communication networks of the three services; thereby bringing in tremendous synergy and synchronisation.

It is expected that the combat operations in the Indian subcontinent would take place in a challenged environment. To bring in functional paralysis, the focus would need to be on targeting the adversary's AI technologies with the help of cyber warfare. Laptops, wireless and mobile devices and IoT sensors are highly vulnerable to cyber attacks. Machine learning can identify and analyse unknown files and detect cyber threats such as malware.[29] AI technologies and systems could therefore be both vulnerable to cyber operations as well as be the enablers that provide protection from cyber warfare. This brings in important changes in the way warfare would be conducted and would include working towards

attaining MDO dominance by initially dominating the cyber and AI dimension at the commencement of conflict.

AI affects the way integrated battle spaces are controlled. It enhances the ability to collate and analyse large amounts of data, fuse it with the multi-domain situational boards, identify appropriate target systems from the maze of information collected, determine its threat potential, facilitate decision making and subsequently complete the operational action. AI provides operational options, reduces response time, minimises emphasis on analyses and shifts to execution, thereby reducing the gap between identification of opportunities to initiation of action. The growth in operative speed implies that the reaction time with the enemy is lesser. The enhanced speed ensures that the side that is able to generate multi-domain capability quickly will have significant advantage in maintaining an upward spiral of combat operations as they operate within the OODA loop of the adversary. In fact, operational outcomes will continue to become considerably larger with every phase of operations as the adversary is unable to coordinate its operations whilst continuously losing vital capabilities.

The only thing that can disrupt this synergy, synchronisation and integration is the adversary's cyber warfare capabilities as cyber weapons infiltrate networks, infect computers and disrupt command & control architecture. The botnets can cause distributed denial of service that causes widespread interference with critical infrastructure. This could include disrupting satellite command & control and crippling vital communication networks. Both defensive and offensive cyber operations would become essential at the initiation of conflict.

AI in Grey Zone/Hybrid Warfare

In hybrid warfare, data could be leveraged to achieve distinct advantages, yet remain below the threshold of conventional warfare. Though kinetic effect may remain relevant, however, AI could play a key role in distinguishing, tracking and neutralising asymmetric elements. Computer vision powered by AI and machine learning is rapidly improving and could help the intelligence agencies to accelerate the scouring of vast amounts of data.[30] With social media and online platforms offering mountains of data, AI could be used to detect and influence operations and identify terrorist plots.[31] AI-based communication technologies and data analytics assist in locating and tracking of such elements and helps in either preventing terror strikes or in neutralising such elements.

The US program "Collection and Monitoring via Planning for Active Situational Scenarios", aims to develop software that gauges adversary's response to stimuli and discerns adversary's intention that gives intelligence on how to respond.[32] The ultimate goal is to provide robust analytics and decision-support tools that reduces ambiguity of adversarial actors and develops simulations to test and understand various potential actions by an adversary employing grey zone activity.[33] AI and cyber operations could significantly assist in identification of hostile elements, profiling them, tracking terror elements and their handlers, building a database, identifying options and eventually neutralising such elements.

Challenges with AI Systems and Ethical Issues

Whilst AI will have a significant impact on future warfare, there are serious challenges with respect to its indiscriminate use. The question is whether machines should be allowed to make life-and-death decisions? Who would be held accountable for actions of autonomous systems: the programmer, the machine, or the state that uses these weapons?[34] Furthermore, AI systems are data dependent and data is mostly collected, identified and coded by humans. This implies that there may be biases and that these could lead to a number of neutrals getting affected.[35] Therefore, some form of human intervention is necessary.

Doctrinal Principles of AI and Cyber Use

Using AI and cyber weapons should ideally follow principles of war and humanitarian laws. Currently, UN Group of Governmental Experts has not reached a common platform on whether or not international laws on state responsibility and Humanitarian Laws should apply in cyberspace and in Lethal Autonomous Weapon Systems. There is a need to clearly identify internationally accepted rules for operating in the cyber domain and for LAWS.

Conclusion

Artificial Intelligence based systems create deep impact on Command & Control, Advanced Weapons, Transportation, Logistics & Maintenance, Use of Unmanned Drones, Grey Zone/Hybrid Warfare and MDO. Though robotic systems significantly enhance military capability, whether machines should take life-and-death decisions needs to be contemplated. Furthermore, AI systems are data dependent and data can easily be corrupted. This implies that there could

be a link between AI and cyber warfare. Moreover, computers, communications, campaign planning systems and command & control networks would become vulnerable. Protective measures need to be adopted and firewalls created whilst preparing a battery of cyber warriors for offensive/defensive operations.

Air Commodore (Dr.) **AS Bahal** is a Visiting Fellow at the Centre for Land Warfare Studies (CLAWS), New Delhi. Views expressed are personal.

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NavIC: Impact and Footprint on Strategic and Tactical Level Precision Targeting by Artillery

GAGANDEEP SINGH

Introduction

Two decades ago, during Op Vijay, the space based navigation system, maintained by the US government, could have provided vital information to assist the operations, but the US denied it to India.[1] To overcome that, India, today has its own, fully functional regional Navigational Satellite System. The commercial use of Navigation with Indian Constellation (NavIC) is in full swing, Qualcomm has launched three new chipsets for android smartphones. ISRO and Airports Authority of India have implemented the GPS Aided GEO Augmented Navigation (GAGAN) project for the Indian Airspace. Use of AIS-140, NavIC based vehicle trackers system, has been operationalised for commercial vehicles.[2] Even the Indian Airforce is presently in the process of using NavIC in fighter jets for navigation.[3] The question arises—"Should we become self-reliant and make our own Precision Targeting Ammunition in India?"—and if yes, then, "Is Indian Defence Industry ready to use Indian Regional Navigation Satellite System (IRNSS) for making Precision Strike Munitions?"

A number of countries are making the GPS guided ammunition for Field Artillery.[4] India has recently bought the Excalibur and Precision Guidance Kits (PGK) for converting the 'dumb ammunition' to 'smart ammunition', at a very premium cost. But the drawback remains i.e. they are dependent on US based GPS. Before,

Indigenous smart munition will enable more rounds on the target due to lower costs.

we analyse the realms of the precision targeting, let us first understand the capability offered to us by the NavIC, to make a beginning towards self-reliance.

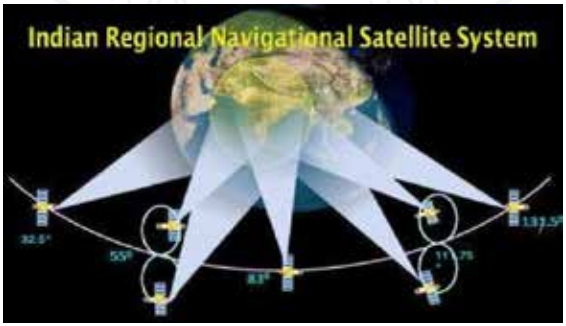
NavIC: The Indian Navigation Tool

NavIC in India, is designed to provide accurate position information service to users up to 1500 km from its boundary (Figure 1).[5] IRNSS will provide two types of services, namely, Standard Positioning Service (SPS) which is provided to all the users, and Restricted Service (RS), which is an encrypted service provided only to the authorised users. The space segment consists of seven satellites. Three satellites in the geostationary orbit and the remaining four are located in geosynchronous orbits. The depiction of the same is given in Figure 2.

Figure 1: Area to be covered by NavIC

Source: SpaceWatch.Global

Figure 2: IRNSS



Source: Geospatialworld.net

Applications of IRNSS

- Terrestrial, Aerial and Marine Navigation
- Disaster Management
- Vehicle tracking and Fleet Management
- Integration with mobile phones
- Precise Timing
- Mapping and Geodetic data capture
- Terrestrial navigation aid for hikers and travellers
- Visual and voice navigation for drivers

American GPS Versus NavIC: Accuracy Matrix

With seven satellites, the NavIC covers only India and its surrounding areas and is considered to provide better accuracy than the American system. NavIC will provide standard positioning service to all users with a position accuracy of five metres. The American GPS, on the other hand, has a position accuracy of 20-30 metres.[6] NavIC is technically superior to the American GPS. "Our system has dual frequency of S and L bands. GPS is dependent only on L band. NavIC is not dependent on any model to find the frequency error and is more accurate than GPS", Tapan Misra, the Director of Ahmedabad based Space Application Centre (SAC), told ET.[7]

Need for Precision Targeting for Field Artillery

Missiles and now rockets in India have started using the GPS guided navigation system, which gives the desired accuracy. The Pinaka guided rocket system gives the rightful impetus to the Strategic domain of warfare.[8] However, the tactical and other limits of the operational area demands more finesse, when it comes to accuracy and the dispersion envisaged at the target end. Rockets are best suited for large area targets such as ammunition dumps, concentration area, engineer dumps, etc. Although, the guided ammunition is being designed to give an accuracy of less than 80 metres, the inherent large lethality area of rockets at the target end, leads to increased safety distance' requirement for own forces.

Overcoming these drawbacks of engaging targets through rockets, coupled with making the Smart Precision field artillery ammunition capable of engaging with desired accuracy through indigenous navigation systems, NavIC will go a long way in making Indian Artillery an arm of deterrence for the enemy and decisive when it comes to launching a strike with precision accuracy. Moreover,

using where and when, are important questions which are to be researched upon properly , in order to ensure minimum or zero collateral damage. Few of the reasons which make the indigenisation of precision strike ammunition a must have been discussed ahead.

- Presently, Indian Army has bought the Excalibur and PGK for 155/39 calibre Ultra Light Howitzers (ULH) only. Enhanced range of medium of all 155 mm guns can be increased to 40 and 50 km for 39 and 52 calibre respectively, in case we make our own precision ammunition.
- NavIC —ensures accuracy and zero dependence on foreign GPS.
- Technology already exists for making these Precision Strike Munitions— Missiles and now rockets like Pinaka have shown the path.
- Today, only limited number of Excalibur and PGK have been ordered, which makes the decision maker really conscious of using the same and only limited targets can be engaged.
- Availability of precision strike capability at tactical level will enhance operational ascendancy at the battle ground.
- Safety distance for own troops, employed in offensive operations, will reduce drastically and will enable fire support as close as 75 to 100 metres of the target.
- Pinpoint accuracy of less than two meters will enable artillery to destroy critical enemy bunkers.
- Ability to engage strategically important targets in sub-conventional environment with precision of sub-metric accuracy and an assured result.
- Minimum or no collateral damage in counter terror operations within/ outside our boundaries.
- Precision strike capability allows engagement deep into the enemy territory without endangering own troops and guaranteed success rate, such as during surgical operations or eliminating prominent terrorist launchpads, headquarters, communication or a prominent terrorist leader.
- Economically too, the indigenous round will be much cheaper.

Having seen the importance and the necessity of making the precision strike ammunition for field artillery, it clearly emerges that the need of the hour is: “India should become self-reliant and make our own indigenous precision targeting ammunition.” Now let us understand precision targeting ammunition in brief.

Precision Strike Munition

Synergised approach by DRDO, DPSUs and Private industry can lead to development of indigenous PGMs.

Precision Strike capability can be achieved by the following two methods.

- **Precision Strike Shells.** These are shells which are manufactured specifically for attaining the precision targeting and hitting the target to as close as 2-10 metres. There are a number of methods to achieve it, like the laser guided, inertial guidance or the GPS guided.[9] The GPS guided shells are better in the present context, as they are not dependent on the constraints of vagaries of weather, the muzzle velocity and the terrain in which they are fired, as is the case with laser guidance ammunition. SMART-155, from General Dynamics Ordnance and Tactical Systems, Germany's GIWS and Nexter Systems' Katana projectile, are few of the precision guided shells which India considered before buying the Excalibur shells.[10] Excalibur (Figure 3) is one such ammunition which India has bought from the US and successfully test fired it in December 2019 at Pokhran.

Figure 3: Excalibur

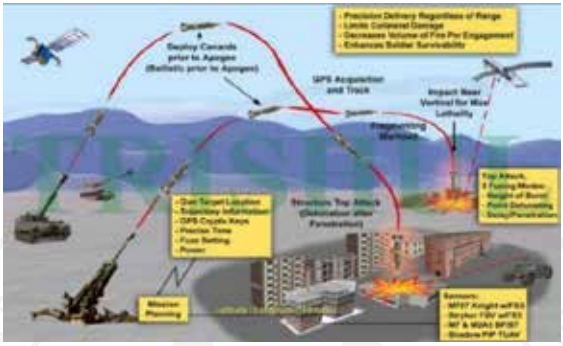
Source: https://images.app.goo.gl

- **GPS Guided Methodology**

The GPS guided shell uses a technology of linking the GPS based navigation chip to the shell through satellite precision codes. This along with the target solution data which includes the target location, the muzzle velocity of the gun, the met, gun position data, is fed through a handheld fuse setter. The inflight guidance is supported by the canards in front. In order to achieve a longer range, these shells are fitted with base bleed units. As a redundancy and whenever there is GPS signal slag, the Inertial Measurement Unit (IMU) takes over and guides the shell. Figure 4 describes the principle of operation of the Excalibur shells' guidance. These shells are designed for providing top attack on the target for better effect and lesser dispersion. The inherent safety

feature, which restricts the shell to burst, if it gets off track by more than 50 metres from the target, enables a high degree of safety to own troops as also obviate any likely collateral damage.

Figure 4: Principle of Operation of Excalibur Shells' Guidance

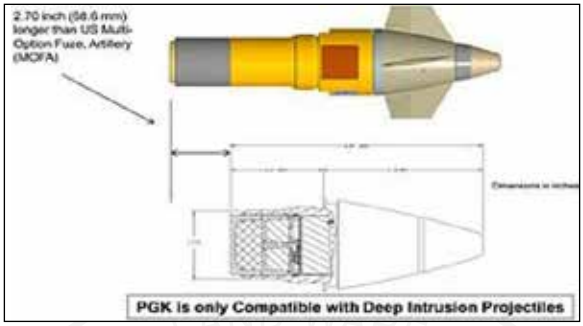


Source: Trishul-trident.blogspot.com/2019/10/m982

- **Precision Guidance Kits (PGK)**

These kits can convert the existing 155 mm shells into precision ammunition by replacing the normal fuse with the precision guidance kits. These kits primarily consist of GPS guidance chip, the canards (or fins) to guide the shell and a fuse setter to feed the correct firing data. These PGK bought from the US, however, presently can be fired only with US origin M549A1 and M795 HE artillery projectiles primarily because of the deep insertion fuse, which require more space inside the shell. Figure 5 depicts the PGK frame structure. This means that we need to buy the entire munition kit which includes the shell, fuse, primer and the modular charge. In simple words, these kits cannot be used with our own existing 155 mm shells. Another important point of consideration is that, this fuse can only correct the trajectory to a limited extent, which means it is highly suspectable to the accuracy of the target data, the muzzle velocity of the gun being fired and the meteorological (MET) data. It can also be referred to as the Trajectory Correction Munition. The need is to have a robust, fast and ground-based MET system, as the data required of MET, needs to be as accurate and as latest to ensure the correct trajectory data is worked out and is fed into the shell fuse. The ground based MET system, bought from the US, is one such system suitable to ensure the stated accuracy—which is up to 50 metres. The cost however is much lesser than the Excalibur precision strike ammunition, for obvious reasons.

Figure 5: PGK Frame Structure



Source: defenceforumindia.com

Pre-requisites for Design and Development

Indigenous GPS guided precision strike munition akin to the US-made Excalibur, can be developed in India—owing to the threshold we have already achieved in a lot of technological means—which these shells or guidance kits will be based on. Figure 6 shows the various parts associated with the PGM and what we need to work on to make this ammunition in India.

Figure 6: Various parts associated with PGM

Source: Strategypage.com

Aimed Development Process—Infrastructure and Technology Building

Now, coming to one of the most important questions: "Is the Indian Defence Industry ready to use IRNSS for making Precision Strike Munitions?"

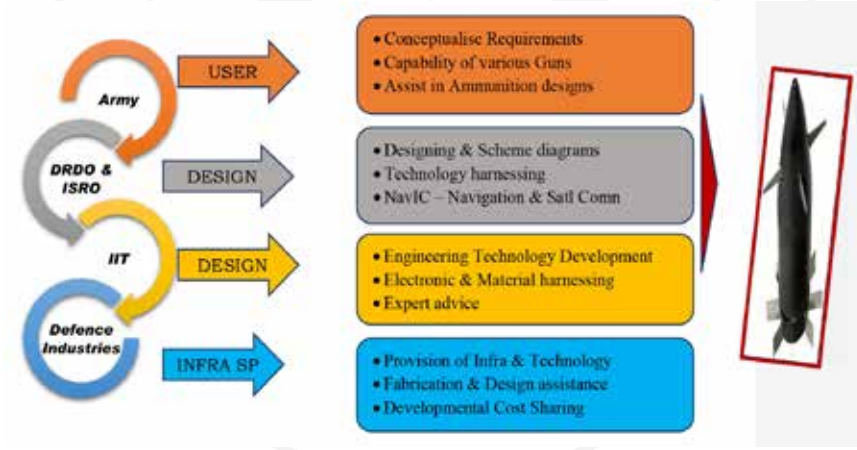
India needs to achieve the technological threshold which the US and BAE BAE Systems AB (Sweden), achieved for the US in about 15 years from 1992 to 2007, when the first rounds were used in Iraq. Today, they are exploiting the technology further by making shaped-trajectory and an accuracy of less than 2 metres, which

India witnessed during the Excalibur firing at Pokhran during December 2019. The dynamism of "Make in India" has given the necessary propulsion to not only the private Indian Defence Industries but also to the Public Sector Undertakings such as BEL, HAL, etc. The DRDO with their 58 labs, played a pivotal role in most of the projects. The need is to incorporate the ISRO and IIT in the entire schemes for providing the necessary design and technological support, and finally connecting NavIC with the entire project and give the necessary impetus to the much-needed indigenous precision strike munition.

Players to Count

The key players which have and would be able to comprehend the technological requirements, enable necessary designs, fabricate and successfully operationalise indigenous precision strike munition are covered ahead in the section that follows.

Figure 7: Key Players



Source : Author's own depiction

Approach to Success

We need to exploit the technologies which have already been proved world over—articulate and merge them with our expertise in various fields and make the Indian Precision Strike Ammunition System. The key contributions expected from the above players are as follows:

- **Army:** As the ultimate user of this potent ammunition, the onus lies on the Army and, in particular, the Regiment of Artillery to conceptualise the

requirement in terms of the effect, methodology, employment efficacy and degree of destruction anticipated from this ammunition system. In addition, there should be complete support, right from the conceptualisation to the operationalisation of this ammunition, of experts of Artillery and EME with respect to the artillery guns and the ammunition systems.

- **ISRO:** The IRNSS-NavIC is a stepping stone for such a project. There is a possibility of development only because today we have our own navigation system. ISRO will have to facilitate both in terms of GPS chips and the satellite communication system as covered in the pre-requisites above. The recent testing of Pinaka guidance rocket having the capability of navigation through NavIC, is a testimony of advancement in the Indian technology. The need is to harness the same for the Artillery projectile system.
- **Defence Research and Development Organisation (DRDO):** DRDO will have to act as the central pillar of the entire project connecting the Army's requirements to the design and conceptualisation by incorporating the Defence PSUs like BEL, HAL in collaboration with Private defence industries together with ISRO. The primary agencies which are likely to get involved with the project are Armament Research and Development Establishment (ARDE), Armament & Combat Engineering Systems (ACE), High Energy Materials Research Laboratory (HEMRL), Missiles and Strategic Systems (MSS), Electronics and Communication Systems (ECS), Micro Electronic Devices, Computation Systems and Cyber Systems (MED & CoS), to name a few. The advantage of DRDO is also in terms of using their Corporate Clusters and the "Make in India" initiative for such a delicate but promising project would gain long-term benefits and increase the operational efficiency of the Army, and thus the country as a whole.
- **Indian Institute of Technology (IIT):** The 23 IIT institutes spread across the country are a premium asset. The Centre for Sensors, Instrumentation and Cyber-Physical Systems Engineering (SeNSE) at IIT, Delhi, is one such institute which can be used for such project designing.
- **Public Sector Undertakings:** Hindustan Aeronautics Limited (HAL) and Bharat Electronics Limited (BEL), the two most effective and prominent defence industries, can support the project especially with their expertise in electronics, aerospace and material technology.
- **Private Defence Industries:** "Make in India" has given the much-needed impetus to the private industries to press full throttle towards the nation's defence infrastructure building. The large-scale defence industries such as

the Bharat Forge, Kalyani Group, Larsen & Toubro, Reliance and TATA group are the prominent ones who can be involved in creating history in India.

Beginning of A New Journey

- The M 777 ULH and K 9 Vajra-T will certainly be integrated with the Indian Army's C4ISR system. This will make artillery more effective plus it will mean that satellite-guided ordnance becomes a practical thing to develop. A 155 mm shell hitting a target does more damage than a 110 kg high explosive 203 mm round that misses by 50 metres. Precision means the army needs less explosive and less shots at target. This capability will come in handy every time the Indian Army launches a massive fire assault against terrorist launchpads located in Pakistan Occupied Kashmir (PoK).
- Currently, an indigenous GPS guided artillery shell does not exist. That's primarily because satellite receivers that are optimised for using coordinates supplied by IRNSS were not designed yet. However, this scenario can change if the Indian private sector is incorporated in development. The defence expos being conducted illustrate the fact that the Indian private sector is more than willing to step up the plate, accept the responsibility and develop cutting-edge technologies. Therefore, with amalgamation of efforts by the key players mentioned above, we can greatly enhance precision accuracy of the Indian Army as in the case of development of NavIC guided Pinaka rockets. Thus, the time is apt and we, as a nation, are ready to achieve this milestone to show NavIC's impact and footprint on the tactical and strategic level precision targeting by artillery.

Lieutenant Colonel **Gagandeep Singh** is presently posted as an Instructor at the School of Artillery, Devlali. Views expressed are personal.

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Absorption of Technology: Need for Change Management in the Indian Armed Forces During Induction of Modern Weapon Systems

RANJAN PRABHU

A nation's ability to fight a modern war is as good as its technological ability.

—Frank Whittle

Introduction

Warfare in the future will not only be fought from the ground on which forces are deployed but will encompass multiple domains of air, space, sea and cyberspace. There are three main pillars of warfare vis. organisational structures, doctrines and technology. These three pillars are interdependent and have driven warfare through the ages. The world today is driven by technology and various niche technologies, whether matured or being developed, can play a disruptive role in warfare. Technology will continue to drive changes in organisational structures and doctrines, to allow for a nation to adopt it and make its armed forces utilise it optimally, to gain asymmetric advantages on the battlefield. Therefore, a nation should allow its armed forces to develop and build/buy the best possible technology which can enhance its capabilities to protect the sovereignty of the nation. However, it must be understood by any military that, simply purchasing a piece of high-end equipment or platform does not essentially lead to capability

building. The requirement is to utilise the 'asymmetric advantage', the platform is capable of providing through a correctly aligned doctrine and philosophy of employment that has evolved along with the platform/equipment. This can only be achieved if the technology is deeply absorbed in the operating culture and psyche of the complete organisation.

Developing new concepts and capacity building requires changes to existing structures.

Traditional Organisations and Resistance to Change

BH Liddell Hart probably said it best: "The only thing harder than getting a new idea into the military mind is to get an old one out". A military organisation is highly resistant to change as a result of its size, complexity, and culture. This is more so because militaries across the world value traditions and its personnel are ingrained with the ethos and culture of respecting traditions. Culturally, defence forces are trained to maintain tradition and suspect the unknown, due to which the personnel are resistant to change. People are very attached to their existing ways of functioning since the same is time-tested and can be banked upon during emergencies. While these traditions and operating procedures bear well in warlike situations to bind the spirit de corps, they act as barriers to change if there is a requirement for organisational or process changes. Therefore, precise change management initiatives are required for enhancing the awareness of defence personnel for adopting change. Even seasoned defence leaders underestimate the degree of inertia and resistance to change within their organisation. Induction of technologically advanced platforms brings with it transformational changes in the way an organisation is required to think, operate and perform. Successful imbibing of such technology is not only about learning the drill to operate and maintain the platform/equipment, but is also about how the organisation evolves its philosophy of warfare around it through transformational thinking developed by the top brass, managed by the middle level and executed by personnel on the ground.

Developing new concepts and building capabilities in the military force, requires a change to the existing practices, structures, processes and behaviours—personal, organisational, and institutional. History has been replete with examples of failed military transformation programmes due to immense resistance to change. Technology, if not implemented along with change management programmes, is bound to fail simply because it would not

Change management programmes need to be tailormade for each level at which they are to be implemented.

be supported by the end-user. Proper sensitising and training of the users and drawing their acceptability, is the most important goal of a change management programme without which implementation will be flawed and the project is likely to fail in achieving its ultimate goal. A glaring example of this is the AWAN mail system in the Indian Army. The mail system was implemented about 18 years ago to reduce paper and printing costs and have a nearly paperless office administration system. While corporates and even certain PSUs like SBI, etc. have gone paperless through emailing and technology-driven archiving systems, the Indian Army continues to struggle to fully implement a paperless office system. The hesitation to go paperless comes from the commander's (at each level) lack of acceptance to move away from seeing daily correspondence in printed form rather than in soft copy form. Due to this non-acceptability adequate focus, efforts and budgetary support have not been given to the creation of a large archiving facility to allow for storage and retrieval system of mails, which is a pre-requisite for a paperless office. The AWAN mail system is therefore simply being used as an electronic medium of mail transfer with printing still being done at sender and receiver ends and not as a fully integrated mail transfer, storage and retrieval system which could have saved huge amounts of costs to the organisation, in the last 15-20 years. A change management programme, had it been dovetailed along with the implementation of this mail system a decade ago, would have by now brought about the necessary acceptability and a change of mindset to fully realise its potential.

Perspective on Technology Absorption

The Indian Armed Forces are in the process of modernising in a major way and are therefore, inducting state-of-the-art weapon systems and platforms. All these systems are transformational i.e. they need structural and process changes in the existing organisation, to be successfully absorbed and exploited. Consider the example of the 155 mm M-777 Ultra Light Howitzer (ULH) being inducted into the Artillery. The gun system's prime claim to fame is its capability to be airlifted by a helicopter to any location in any terrain, thus bringing about a transformational change to the way, traditional firepower is provided by the artillery. However, the prime air assets, capable of airlifting these guns, are held and operated by the IAF, while the guns are manned and operated by the Indian Army. While traditionally the artillery units are self-sustained, for the movement

of their guns through their integral transport, but in case of this gun, move by air needs IAF support. Thus, the gun's capability to be deployed by air and be utilised to its full capacity needs efficient and close coordination between the two services, and a re-structuring of traditional processes of demand for air effort. Moreover, a magnitude of change in the traditional mindset will also be required on how air support is provided, cutting through layers of controlling agencies at a speed which is desirable in important operations for the timely provision of critical firepower from an equipment whose capability of air deployment would be invaluable in difficult terrain.

A second example of the requirement of change management is the ongoing induction of the 155 mm K-9 Vajra Self Propelled Gun system. An autonomous and self-propelled artillery gun system, it is set to transform the way firepower is provided to mechanised formations in desert and semi-desert terrains. The Indian Army lacked a similar system, even when its operational doctrines of mechanised formations underwent major changes over the same period. The induction of this system will plug the gaps in mobility and reach, that is felt severely due to the absence of a tracked artillery gun in the Indian Army. However, being a fully autonomous system, the gun can move independently, deploy and fire, thus breaking away from the traditional scope of command and control at a battery level while bringing it down to the crew level. While such deployments may not be carried out often, but would need to be practiced and incorporated into operational philosophies should the need arise. This will again require a change of mindset of not only the crew who are traditionally used to moving under command of a battery group, but also at the level of commanders up the chain to be able to delegate command as is prevalent in armoured units. Hence, it can be clearly understood that modernisation is not only about procurement of hi-tech equipment, but is also about bringing a complete change into organisational structures and processes, which allows for full exploitation of its range of capabilities.

Modern Change Management techniques need to be implemented in our modernisation programmes, in order to fully realise their goals. These change management programmes need to be tailor-made for each level of implementation. Case studies and research have shown the invaluable contribution of change management in defence related projects. A good example of managing change in the defence sector is the initiative of the British Government in 2010. The British Comptroller and Auditor General (CAG) office had advised the British Ministry of Defence to engage in a

major programme of communications, as a change management initiative for transforming the British Defence organisations into leaner and meaner units by reduction of its civilian personnel by 29,000 and its military personnel by 25,000 by 2015.[1] Such studies need to be analysed to understand the concept and its advantages. In our context, we have had successful change management initiatives incorporated by L&T InfoTech (OEM) during automation programmes like the Computerised Inventory Control Project (CICP) of the Army Ordnance Corps, which ensured a high degree of user integration and acceptability during its implementation.

Steps to Dovetail Change Management

The following steps needs to be undertaken to successfully incorporate and implement a change management programme into any modernisation project of the defence forces.

- **Identify Major Capabilities of Project/System being Inducted:** The major capability enhancements on implementation of the project need to be identified, to be able to determine methods to utilise the same.
- **Evolve Operational Philosophy:** Operational Philosophies which can fully utilise the identified capabilities, will need to be evolved.
- **Identify Structural and Process Changes:** Organisational structures and process changes would need to be formulated, which will be the key drivers of these philosophies.
- **Analyse and Identify Barriers to Change**: Barriers to the structural and process changes would need to be identified and analysed to be able to evolve a Change Management Programme that can then be implemented to overcome these barriers.
- **Implementation of Change Management Programme:** An integrated Change Management programme will need to be implemented under the overall ambit of the Project Management programme which is professionally-driven, in consultation with internal change agents through a top-down approach.

The implementation stage is very crucial in any change management programme as it recognises the major challenges in the current work culture, practices and philosophies. Further, at this stage important areas are worked upon, like connecting with end-users and sensitising of the environment with the new capabilities, capacity and capability building through training and

ensuring through reinforcement measures that, old methods and practices are not revived due to acceptability issues as they could be detrimental to capability utilisation.[2]

Conclusion

Time-tested methods of change management like PROSCI (PROSCI is a change management methodology formulated by a company of the same name) allow for greater participation of the user of the system and seeks higher participation and readiness in acceptance of the need for change. An integrated change management module along with each new weapon system's induction programme, which envisages transformational operational changes, is a need of the hour to ensure complete utilisation of its gamut of capabilities. This can only be possible if the organisation, which is inducting the system, is convinced of the need for change and is its strongest advocate.

Colonel **Ranjan Prabhu** is an Instructor in the Faculty of Gunnery, School of Artillery, Devlali. The views expressed are personal.

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Firepower and Technology: Need for A Change

RAGHUNANDAN MC

Introduction

Warfare has two important components — Manoeuvre and Firepower. Manoeuvre is the art of thinking and making a strategy to defeat the adversary, whereas firepower is the destructive capacity of the armed forces[1] i.e. the capability to deliver effective fire using missiles, bombs, guns and other warfighting machineries. Historically, warfare has been conventional, having the concepts of fixed defences and attacks, however, revolution in military affairs (RMA) has modernised the weapon systems of countries, thus, bringing a tremendous change in the way the future wars will be fought. The future battle space will be shaped by technology and technological superiority will determine the outcome of future battles. Technological self-reliance must be the 'mantra' for the future. A collective national effort needs to be initiated to ensure that technological developments are commensurate with our desired military capability.[2]

Ammunition serves as a platform for the constituents of firepower. It is the payload and is the most important element of firepower, that can be delivered through different dimensions such as land, air, sea and the new domains such as space and cyber in future. However, with the advent of RMA, the terms 'information operations', 'net-centric warfare', 'digitisation' have taken the centre-stage.

Some of the ammunition that have been used in the battlefield include, Small guns, Rockets of artillery, Tanks, Aircrafts, Missiles and Armed Helicopters.

With the changes in technology and expansion in the domain of battlefield, new ammunitions such as Unmanned Combat Aerial Vehicles (UCAVs), Long-range Missiles, Cyber Malware, Propaganda in the emerging Information Warfare domain, etc. have been introduced. Along with these, countries today have developed strategic variant of ammunition which comprises Chemical, Biological and Nuclear weaponised ammunition that results in large scale devastation. Therefore, the constituents of firepower have to be used optimally to ensure victory. This can be attained by shaping the battlefield to own advantage with right combinations and shielding the adversary's counter fire by modernising our equipments and forces.

As 'game-changing' disruptive technologies are being developed and the power balance is being remodelled, it is time for policymakers to examine and shape the security environment in India's favour by rapid modernisation of its armed forces. In the present day scenario, owing to the various complex security challenges that India faces, it is the need of the hour that, Indian Armed Forces should prepare a Hybrid Warfare Doctrine covering Multi-Domain Operations (MDO). There is also a need to re-examine the constituents of firepower and upgrade the same with new technologies, to be adopted in the complex Indian environment.

Evolution of Firepower

Invention of gunpowder in the early ninth century brought about a revolutionary change in the way battles were fought. History indicates that, the gunpowder was invented by the Chinese to fight the Mongols. Firepower was introduced into the battlefield through the cannons and was used in various battles across the world. Europeans invented smaller guns that could be filled with a ball of gunpowder and be ignited. Gradually, by the end of fifteenth century the world had witnessed many different lengths of canons causing large scale destruction to the enemy. Cannons played an important role in winning battles, both in historical times and in today's wars. This proves that, firepower has always been very important in fighting a battle and it becomes all the more so in this modern age of manoeuvre warfare. Two World Wars were fought in the twentieth century and technology had developed immensely between these two wars. Usage of small arms, anti-tank missiles, artillery guns, and greater firepower was being used to unleash greater destruction on the adversary. This was evident in US' attack on Hiroshima and Nagasaki, following the attack on Pearl Harbour, which changed the dynamics in the Second World War. US' attack is often seen as the

greatest show of firepower in Nuclear version. Post the World Wars, the era of small wars or limited wars saw the development of precision weapons. One of the most significant wars that saw a major development of technologically advanced weapons in recent times was the Vietnam War (1955-75). It saw the first use of Unmanned Aerial Vehicles (UAVs) which later got upgraded to UCAV. 155 mm Cannon launched Guided Projectile (CLGP), was one of the first precision to be used.[3] These weapons could achieve the objective without much collateral damage.

Technological development and its application in firepower has witnessed development of powerful guns, bombs, Missiles, Anti-Ballistic missile, high-energy weapons and so on. Technological developments have added new domains in the battlefield, thereby making it very complex and efficient. However, MDO rightfully recognises that, hidden technological innovation has added new layers of complexity to operations. The complex challenge is set to increase when the armed forces add Cyber and Space into the calculus of battle.

Technological advancement has enhanced the firepower potential by a great magnitude. In the present day battlefield, there are better capabilities for good surveillance and reconnaissance leading to precision firing and destroying the enemy's will to fight and paving path for a big victory.[4]

Indian Perspective

India faces complex security threats and challenges from a wide range of state and non-state actors. India shares a very hostile and contested borders with both its western and northern neighbours—Pakistan and China respectively. Alongwith the hostile neighbours, India fights various sub-conventional conflicts; proxy war and state sponsored terrorism by Pakistan in Jammu and Kashmir; Insurgency in Northeast; Left Wing Extremism in central and southern India; Fake News; false propaganda, cyber attacks, etc. There is a need for a 'Whole of Government approach', in winning strategically along with some tactical measures and use of firepower to fight the adversary. If not dealt effectively, they could turn out to be very difficult problems to resolve.

As the technological development is taking place rapidly, the military spending by our adversaries has also increased manifold and China has clearly emerged as a prime threat in our neighbourhood. Pakistan has been completely dependent on China for its firepower and technological advancement. China has been growing militarily, technologically and economically with a global footprint. China's military spending has increased by an average of 10 per cent annually

over the last two decades[5] and has expanded its conventional capabilities in an Informationalised battlefield.[6] In recent months, there has been numerous incursions by the Chinese along the LAC in Ladakh region which are progressively increasing despite the commander level talks on June 6, 2020. China has also been aggressive in issuing statements from its state' mouthpiece *Global Times*, claiming the disputed territory as theirs. India must remain committed to further develop its border infrastructure along the LAC to strengthen its capabilities.

Changes in 4GW requires refined strategy to win wars.

Pakistan on the other hand, has increased its proxy war capabilities, with almost 300 terror base camps along the LoC, on which India is keeping a close eye to prevent them from infiltrating into India.[7] Surveillance through UAVs, drones, satellite imagery and other electronic intelligence mechanisms have been increased to a large extent and India should be prepared to fight the two-fronts simultaneously.

With these threats, it becomes very important to understand the need to rapidly modernise our forces for the immediate future. Information Technology (IT) has also created new critical vulnerabilities and we need to have a relook at our adversaries, map the critical vulnerabilities and build our capabilities accordingly. The revolutionary change in the 4th generation warfare (4GW) requires a redefined strategy to win wars and "one size fits all" attitude of the policymakers must be avoided.

Modernisation

The emerging security scenario, both at the regional and global level, requires the Indian Armed Forces to maintain high preparedness level in various spectrum of conflict. Technological superiority is going to be the decisive factor in winning future battles. Planning and execution of these emerging technologies should be the focus for our joint war fighting strategy in the future.

The future combat systems will include battle tanks and infantry combat vehicles with high degree of manoeuvrability. The future wars will be lethal; hence, armed forces must adopt rapid modernisation in terms of mobility, lethality, precision guided missiles and robotics. Cyber and space would be in the frontline of the battle, therefore having an integrated command and control centre will be beneficial.

The new wars will be fought in various domains simultaneously and will be dependent on technological developments. These battles will be engaged in

network centric environment with speed and precision. The objective would be to attack the adversary with firepower and achieve decisive victory in limited time. Firepower would be effectively used against non-state actors in sub-conventional conflict with more precision to avoid any collateral damage. To choose the targets for precision firing, actionable intelligence is very important to achieve the desired results. Weapons used during such a scenario would vary from attack helicopters, guided missiles, ballistic missiles, small arms to UCAVs and guided ammunitions. These weapons will be technologically advanced, having the capability to fire both during day and night. Firepower will continue to play a predominant role in conventional and sub-conventional conflict especially in the Indian environment where territorial dispute may result in many border tensions and skirmishes.

Wars are no longer decided on the ground or in air or at sea alone; decisive victory is achieved only when there is an integrated effort with use of high-end technology, to bring about maximum destruction in adversary's war fighting capabilities. Artillery alone cannot give the desired victory in future, although artillery is expanded and modernised, the future wars require combined and integrated use of firepower.

The security environment in our neighbourhood is fast changing; China has been enhancing its war fighting capabilities by upgrading its weapon systems with technology such as Artificial Intelligence, Big Data, High Energy Weapons, UAVs, missiles, etc. Hence, we need to change and adapt to these fast-changing scenarios in our immediate neighbourhood.

Challenges to Firepower in Future Wars

Space, cyber, AI, machine learning, UAVs, ballistic missiles, quantum technologies, high-end communications, will be used in the future battlefield. The major challenge would be to not only integrate these technologies into military system but also to have their manufacturing bases. The turnaround time for innovation to deployment in active military should be faster.

Effectiveness of firepower will depend on the following:

- ***Battlefield Transparency (BFT):*** There should be more synergy between the inter and intra services. Joint exercises between the Indian Army and the Indian Air force needs to be further built. There should be synergy of all the constituents to ensure precision strikes from long-range with increased lethality. BFT must be enhanced to ensure to see the hit at real-time.

- ***Networking:*** Information streamlining between the three services needs to be enhanced and accelerated. The future wars will be fought in network centric environment. Networking plays an important role in giving an edge over the adversary and having a decisive victory.
- ***Satellite Surveillance:*** Real-time transmission of data from satellites to ground force is non-existent. More needs to be done to enhance the real-time data sharing among the strike corps.
- ***Employment of UAVs:*** This is very important for conventional operations. Procurement and upgradation of infrastructure needs to be fastened and the Indian Army should be given the priority.
- ***Precision Force:*** Capability to destroy selected targets with precision using the information available through enhanced communication and battle space awareness. We need to enhance the sensors to shooter grid for timely application of force comprising of surveillance and target capabilities for the employment of precision guided munitions.
- ***Military Operations in Built-Up Areas (MOBUA):*** We need to enhance our capabilities to undertake operations in Built-Up areas to achieve military objectives, with minimum casualties and collateral damages. Use of precision weapons, surveillance sensors, navigation systems and improving communication systems are vital. Combat readiness to fight in urban areas, training and enhancing the firepower, force, protection and manoeuvre are the key to secure victory in urban areas. The challenge is to integrate the technologies into coherent interoperable systems optimised for MOBUA.
- ***Logistical Support:*** The capabilities that enhance mobility, employability, usage of firepower, cannot be achieved without a revolutionary change in the concept of logistical support. Revolution in Military Logistics (RML) will have to be an integral part of any technological advancement, that are being used to upgrade warfighting capabilities. Military technology must concurrently maintain its advantage in key strategic areas and deny asymmetric advantages to the adversary.

Conclusion

Modern conflict/wars are more likely to manifest in prolonged diplomatic engagement mixed with occasional use of force. Fundamental objective of the armed forces is to win wars. The armed forces must look to have greater manoeuvres in the realm of responses for scenarios that are below the threshold of an all-out war. The response short of war (RSOW) domain can alter and impact

Space and ISR capabilities are moving from enablers of firepower to decisive factors in winning wars.

the geostrategic spaces by creating military pressure points to fulfil strategic and foreign policy objectives.[8]

Traditional domains of firepower are being overtaken by new domains, with precision-based weapons. Space and ISR capabilities are moving from enablers of firepower to decisive factors in winning wars. India should build a robust cross-domain capability to take care of any present and future threats. The direction and pace of advancement of technology cannot be predicted accurately. However, we need to develop:

- High degree of transparency in the battlefield by means of integrated space-based, air borne, heliborne and surface-based sensors with high resolution imagery and real-time flow of information at all levels.
- Enhance our capabilities in chemical, biological, radiological and nuclear deterrence.
- Develop a fully integrated combat aviation fleet, supported by reconnaissance and logistical platforms. The futuristic aerial platforms must comprise of state-of-the-art weapon and navigation system.
- Develop capability to undertake protected operations in built-up urban/ semi-urban environment with minimum casualties.
- Organisations dealing with military and technological development have to be reconstituted so that they concentrate on producing high level advanced technological weapon system in a very limited turnaround time.
- Allocation of funds to the R&D must be increased to support startups and young scientists.

Victory in future wars can be achieved only through integration of the tri-services and greater firepower. The tri-services must speed up their modernisation process to be future ready and technology must drive the doctrines and not the other way round.

Mr. **Raghunandan MC** is Website Manager-cum-Researcher at the Centre for Land Warfare Studies (CLAWS). Views expressed are personal.

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SCHOLAR WARRIOR

SECTION IV

MILITARY HISTORY AND MOTIVATION

CENTRE FOR LAND WARFARE STUDIES

Kashmir 1991-92: A High Stakes Challenge Posed by the Proxy War

JJ SINGH

We, the people of Jammu and Kashmir, have thrown our lot with Indian people not in the heat of passion, or a moment of despair, but by a deliberate choice. The union of our people has been fused by the community of ideals of common sufferings in the cause of freedom.

Sheikh Abdullah in June 1948

Introduction

As the Airbus 320 glided over the snow-clad Pir Panjal range on a clear morning of the new year's day in 1991, I was once again awestruck by the natural beauty of the valley. The exhilarating sensation that I had experienced the first time that I had crossed the Banihal Tunnel, as an excited wide-eyed teenager in 1958, flashed through my memory. A lot of water had come down the Jhelum in these three eventful decades. This was my third posting in Jammu and Kashmir (J&K). And, *sans* doubt it was the most important of them all as I was to assume command of 79 Infantry Brigade (Inf Bde) at this crucial juncture in the history when Kashmir was aflame again.

Operation (Op) Topac, a brainchild of General Zia-ul-Haq had been unleashed in 1989-90 with an aim of 'liberating' Kashmir Valley through an insurrection and consequently its assimilation with Pakistan. Having lost every war over Kashmir, the Pakistani planners realised the futility of trying to achieve their aim by a conventional war. The Pakistan Army changed track and came out with an articulated strategy of a 'thousand cuts' to gain the valley of Kashmir at least.

By adopting Liddell Hart's precept of indirect approach where he emphasized that "in strategy, the longest way round is often the shortest way home", we were caught up in a classic case of irregular warfare—a low cost proxy war and insurgency where the lead role was being played by non-state actors whose masters were across the Line of Control (LoC).

In the first phase, Op Topac with the slogan of "*Azadi"* envisaged subversion of the youth, key elements of Kashmiri society, the intelligentsia, government officials, academia, teachers and even the police. Military training and provisioning of small arms and ammunitions and use of explosives was a part of this phase. Thereafter, the plan involved the isolation of the far-flung areas and rendering them inaccessible by targeting the communication systems and destroying the bridges. This was to deny the Indian Army and Paramilitary Forces the advantage of superior mobility. The next stage was to radicalise the society starting at the primary school level. All such schools were burnt down and were replaced by *madrassas*.

The next stage envisaged the targeting of vulnerable army posts and installations and ambushing of military convoys. The final phase was armed insurrection in which foreign elements and Pakistani collaborators would come to the aid of the Kashmiri freedom fighters! Kashmir was rapidly being taken over by fundamentalist ideology, the philosophy and tradition of *Kashmiriyat* and *Sufism* were being thrown overboard, and the Kashmiri pandits were forced to flee. The 'inept' and 'highly corrupt' administration under the elected government simply watched and allowed the law and order situation to become abysmal. This led to the imposition of Presidents' rule under Shri Jagmohan in January 1990.

Operational Environment

It was going to be a 'make-or-break' assignment for me and the intensity of operations was going to be immense. Driving under the cover of a heavy escort from the airport to my brigade headquarters (HQ) with the security barriers and picketing on the roadsides, made it look like a war zone; that was in fact, exactly what it had been turned into. It was the peak of insurgency in J&K and the people were made to believe that *Azadi* was around the corner. The tension in the air was palpable. Being the Corps reserve, 79 Inf Bde was placed directly under the Corps HQ and located at Khreuh near Srinagar. I reported my arrival at the Corps HQ and once the briefings were over, including the customary introduction to the Corps Commander (Cdr), I proceeded to my HQ. The Corps Cdr was a hardcore infantryman and he directed me to get familiarised with my operational tasks and preferably by trekking through the knee-deep snow.

Having thus carried out reconnaissance and familiarisation of all important posts, I called for an operational conference of my key subordinates, the Commanding Officers (CO's) and other key members of my staff. After having heard them giving a review of the situation of their respective areas of operations, their operational readiness state and morale of troops, I gave out my policy and Key Result Areas (KRAs). First and foremost, it was our preparedness to undertake our primary conventional war tasks, if and when the balloon goes up, followed by achieving our training and logistics KRAs. Our motto shall be *"Fight to Win and Win with a Knock-Out"*. I impressed on my battalion (bn) cdrs that, the 'incipient insurgency' is likely to intensify sooner than later. The stakes were very high and the challenge was to be met by the highest standards of leadership being displayed by all of us. As such, we need to reorient ourselves and our commands to undertake counter-terrorism operations. Besides superior tactics at sub-unit levels and close-quarters combat and shooting skills, we must accord the highest importance to honest reporting and human rights while carrying out any mission. Mistakes made while taking actions in good faith would be acceptable to me, however there would be zero tolerance for false or dishonest reporting or deliberate violation of orders.

Kokernag Incident and Aftermath

The Kokernag incident was my first operation and we did not live up to the expectations. A small group of terrorists had taken few hostages and holed themselves up in a fire station building in Kokernag, South Kashmir. They demanded the release from jail of some of their *tanzeem* (organisation) members. The Corps HQ tasked us to rescue the hostages and neutralise the terrorists; because of time criticality, the task was assigned to the battalion which was located at Khanabal and was closest to Kokernag. I briefed the CO on telephone as time and space did not make it viable for the CO to travel 30 km up to the bde HQ and return and then launch the task force. However, he was provided with all available information and clear orders regarding the mission in a message.

The CO decided to send two companies under his second-in-command to undertake this operation. Since the objective was about 10-15 km away, the plan was to move tactically in two prongs by vehicles and on reaching the vicinity of Kokernag, to advance rapidly on foot and establish a cordon around the objective with one company and to launch the operation to rescue the hostages with the second company. Unfortunately, a simple yet sound plan went awry due to the circumstances and a series of unrelated errors.

Thinking that their column would reach the objective in a faster timeframe, one of the company cdr took the help of a local policeman to guide them to Kokernag as it had gotten dark and they did not know the roads well enough. That policeman turned out to be a fifth columnist who had been subverted by the *Jihadis*. He not only gave early warning to the terrorist organisation, the *Hizbul Mujahideen*, but also led the column into an urban ambush. The company fought through the ambush but suffered few casualties and halted a little distance away. It was around 2000 hours. Resultantly, this company never reached Kokernag and instead, the CO moved up and having taken stock of the situation, ordered the company to pull back to the base along with the casualties.

All these actions taken by the CO were without either informing the bde HQ or taking approval for the withdrawal of the second company. On the contrary, the information being passed on to the bde HQ was incomplete and blatantly incorrect. They claimed to have reached the objective and the link-up of the columns had taken place and the cordon was in the process of being established and the operation was going on. I was closely monitoring the situation every hour or so. The battalion never informed the bde HQ of the ambush that one of their companies got caught up in. Accordingly, we kept conveying incorrect reports up to the chain of command. It was perhaps around 0100 hours the next day when I asked the CO about the progress of the operation and the latest situation, he apprised me of the ambush and the casualties suffered by his troops. He had no answers for why he kept us in the dark or justification for the various actions he had taken. I decided to move up to Kokernag without further ado despite the restrictions on movement, without the road opening parties having cleared the road. By the time I reached the objective area, most of the terrorists had slipped through the cordon. Two or three of them were still there with the hostages and were lobbing grenades and firing intermittently from the fire station building which was a concrete double storey structure. In the meanwhile, around 0800 hours, the GOC of the Division and the Corps Cdr also arrived at the scene of action. As they were being briefed by the CO, a grenade blasted nearby and a splinter hit the Corps Cdr near the eye. Fortunately, it was not very serious but nonetheless it was a close call. In the melee, the remaining terrorists also escaped but were forced to abandon the hostages. It was undoubtedly a botched-up operation that embarrassed all of us.

As the Bde Cdr, I accepted full responsibility for the failure of the operation and apologised to the Corps and Division Cdrs, namely Lieutenant General MA

Zaki and Major General VP Malik (he later rose to be the Army Chief) respectively. I assured them that we would take corrective measures and ensure that such mistakes did not recur.

At the same time, I could not but take a very serious view of the lapses that had occurred. I had made it clear to my leaders, on assuming command of the bde three weeks prior, that I was prepared to accept tactical mistakes and errors of judgement of actions taken in good faith, but would not tolerate any deliberate act of lying or misinformation. Accordingly, I requested both the Corps and Division Cdrs to consider replacing either me or the CO of the bn as there had occurred a grave breach of faith between the two of us. Resultantly, I could no longer trust the CO. Having explained the whole scenario to them, I requested for a decision on the spot. The Generals called the CO aside and asked him for his version of the events and then went into a huddle. After a while they said to me that the CO would be relieved from command. I thanked them and then sought their approval for the bn to be disengaged from active operations and be trained under my supervision for a month at Khreuh. Much to my relief it was also agreed to. But this was not the end!

It became clear to me then, that my performance thereafter would have to justify the strong stand that I had taken or else my neck would be on the guillotine too! Like the CO who was sacked for operational lapses, for me as well, the writing on the wall was crystal clear: 'PERFORM OR PERISH'.

It was at this juncture, that the concept of Rashtriya Rifles (RR) took roots. Upon raising, the 1st Sector of RR came up at Anantnag sector in 1991 and their HQ replaced us at Khanabal. Consequently, our bde was moved to Baramulla sector and was employed for counter-terrorism tasks in the depth area between Uri and Baramulla, in addition to our main tasks as the Corps reserve.

We took up the challenge with all earnestness and a missionary zeal and our results in the next few months began to speak for our actions. In the next two years, the same battalion led by a new CO became one of the most decorated units in the Chinar Corps. The battalion received the 'Unit Citation' from the Army Chief in recognition of its sterling performance during 1991-92. The other units did very well too and contributed handsomely to make our bde's achievements an envy for the rest of the Northern Command.

Lachhipura-Uri Sector (1991-92)

The mantra for success in counter-terrorism/insurgency operations ,is an iron fist for the terrorist and a velvet glove for the people.

According to the plan made by the Corps HQ in May 1991, the area north of the Jhelum River up to the Naugam sector going along the Chotta Kazinag Dhar range up to Baramulla, would be the new area of operational responsibility of my bde. The Cdr of Uri Sector handed over operational control to me of this 'lightly guarded area' along the LoC, an area perceived to have a low probability of infiltration by terrorists. He claimed that, not a bird flies through here between the Jhelum and Kala Pahar up to Baramulla. Hence, this area's operational responsibility has been given to a BSF bn. This assessment proved to be way off the mark. Our revised deployment in two additional tiers with multiple ambush positions took the terrorists by surprise, and hence started yielding results rapidly. As a matter of fact, the ISI of Pakistan, who were the masters of these terrorist organisations, had engaged local Gujjar shepherds to guide the terrorist groups and facilitate their infiltration through seemingly impossible routes. They were fairly successful in doing so till we discovered some of these routes and achieved quite spectacular results during the next few months, making our ops the lead story in the Frontline of 31 January 1992. The Corps Cdr was delighted as his assessment had been proven right!

'Mousetrap' was the name given to a series of counter-infiltration ops that we conceived and successfully executed during the latter part of 1991. What we believed was a tightly interwoven and dynamic matrix of positions in tiers that would help us to detect and neutralise the infiltrating terrorist groups, was discovered to be porous too. Our sources told us that, though we had neutralised a large number of terrorists, an almost equal number of them had gotten through. Quite often taking advantage of difficult terrain and adverse weather conditions particularly at night, during snowfall or lack of alertness of troops deployed along the LoC, the terrorists were able to penetrate the first-tier LoC positions and infiltrate deeper. That is where they were confronted by the second or third-tier deployment and ambushes and were either apprehended or neutralised.

One of the finest actions of Op Mousetrap began in a very bizarre and unexpected manner. At 0800 hours on November 27, 1991, the sounds of a shooting engagement were heard by us across the Jhelum River in the proximity of the Bde HQ at Mahura. The Brigade Major (BM) Major RPS Mann was asked to find out what was happening. The bns deployed on the LoC were not aware of

any encounter in their area of ops neither could their troops hear any gunshot sounds, perhaps due to the screening effect of the intervening ridges and spurs. To us, as discerning soldiers, these shootouts left no doubt that an intense fire fight was on, and the encounter did not appear to be taking place too far away. But the mystery was that, there was no radio communication emanating from either side. I felt that something had to be done and that we needed to act fast.

Figure 1: Sketch depicting Op Mousetrap

Within few minutes the quick reaction team along with my protection party was lined up and after issuing necessary instructions to the BM, accompanied by the bde education officer Capt VK Singh, who was officiating as the GSO3 (Intelligence) too, we took off towards the scene of action. Crossing the Jhelum over the only bridge that existed in that area, we headed in the direction from where we could hear the exchange of fire. The sounds became louder as we closed in and quite unexpectedly we saw a group of soldiers running down the road towards us. They were carrying only their personal weapons. They were ordered to halt and questioned whether they were running away from the area of the skirmish or encounter. Unbelievable as the whole scene kept unfolding, I was told that they were doing a map reading point-to-point exercise totally unconcerned with anything else happening in the area. It was a bizarre operational comedy of sorts to say the least! I then questioned the junior commissioned officer (JCO) in charge of this 'motley group' of 20 odd soldiers if they were carrying any ammunition on them. One magazine each per rifle was all they had, was the timid response.

On my signal Capt VK ordered them to mount on the one ton trucks and we took them along just in case they would be needed. Finally, we reached the immediate vicinity of the scene of action. VK hastily organised the extra manpower into three squads under the JCO and joined me as we crouched forward cautiously. It was

then that Capt SS Anjaria of a Gorkha bn under my command crept up taking cover of the folds of the ground and briefly explained the situation to me while bullets swished past and grenades blasted all over. It was evident that the young officer was under tremendous pressure as his group, of about a section worth, was clearly outnumbered. As he moved in a hurry he had also got detached from his radio set operator. The large group of terrorists who had crossed the LoC had cleverly bypassed the first two tiers of counter infiltration positions and were heading for a large village on the bank of Jhelum. Against all odds, Anjaria and his squad had done an extraordinarily brilliant manoeuvre to block the route of the terrorists. He engaged them in a skirmish and forced them to hit the ground and take cover even though the terrorists were at a higher elevation. I was truly impressed by the gallant actions of this brave officer and gave him a solid pat on the back.

Thereupon, I asked Anjaria to continue with the good job that he was doing and focus on his task, and to make full use of my personal protection team of Dogra troops along with his Gorkha boys to make an effective inner cordon and organise a loose outer cordon with the map reading test guys. He acknowledged with a beaming smile, as the relative strength factor had swung in our favour. Our aim was to get as many of the terrorists in our bag as we could. In the meanwhile, VK apprised the bde HQs and Anjaria's bn of the situation and progress of the operation that was taking place. In the encounter so far, Anjaria's daredevil Gorkhas had accounted for eight to ten of these terrorists whose bodies could be seen littered around on the broken ground ahead of us.

The exchange of fire was taking place sporadically, while we continued getting the better of them. In a matter of an hour or so, we knocked down a few more with no casualties on our side. We were confident that in few hours we would be able to get them all as they were trapped in our 'two-ringed cordon' and end the operation. At this juncture, around 1100 hours, I felt a jerk with sudden piercing pain in my left thigh region. The realisation that I had been shot, struck me when I felt some warm fluid flowing down from the left side of my groin and the buttock. It was blood oozing out from both the wounds. I told Anjaria not to worry about me and carry on with the operation that he was handling so admirably.

I slumped to the ground and was assisted by VK and taken to a somewhat secure place nearby. A field dressing was hurriedly applied to stop the bleeding. Thereafter, the bde medical officer also arrived. He examined the wound and did a fresh dressing and as the pain had become unbearable he gave me a shot of morphine. By the evening I was evacuated by a helicopter to the base hospital in Srinagar, and on landing there was taken straight to the operation theatre.

By about 1900 hours when I regained my senses, the first thing I enquired was about the status of the operation. I was told that we had neutralised over twenty terrorists and had no casualty on our side besides myself. It was conveyed to me that Op Mousetrap was a resounding success, and we had received a congratulatory message (signal) from the Army HQs:

> *reference operations of 79 Inf bde in op mousetrap (...) request convey appreciation and congratulations of chief of the army staff to concerned troops ...*

This Gorkha bn was awarded the Unit Citation for their outstanding performance and was considered one of the best bns in the Northern Command theatre. The turnaround of this paltan because of the change of the CO prevented the repetition of the earlier setbacks such as the 'Yusuf Jameel case' (a BBC reporter based in Srinagar who was apprehended and held in unauthorised custody by a company cdr for two days without keeping the CO or the unit informed during December 1990) and a hopelessly botched up operational mission in January 1991 would make an extremely useful case study. Such an impressive performance and transformation of a bn makes it an eminently suitable model to draw lessons in leadership, tactics, ethics, moral, courage and so on during the conduct of counter-insurgency operations at unit and sub unit level.

Reflections

During the entire duration of my command tenure, I always made myself available for guidance and control of operations, whenever a bn or more was assigned any task. I would invariably move with the task force with a compliment of my tactical HQ and locate myself at a vantage point, rather than sit in my office and wait for information to come in through the staff. It is my conviction that cdrs at bde level and downward will face unforeseen tactical battle challenges, and hence they should position themselves close to the scene of action where his troops are launched into an operation. Being responsible and accountable, as field cdrs, they ought to be able to influence the actions that are being taken particularly when it is felt that the situation could turn ugly, get out of control or require intervention by the GOC of the division. And in the battle or for that matter even a skirmish, it has been my endeavour to be the 'top dog' or in other words be in command of the situation at all times being on the ground, and that cannot happen with remote control.

My experience of the messy situations that junior leaders and troops could land up with while conducting CI or CT ops at the tactical level is that, on many

occasions, decisions which might have far-reaching consequences, have to be taken there and in real time. Unexpected situations or developments erupt which have a time-criticality clause with no textbook solutions, and these have to be handled on the ground based on the judgement and experience of the cdr on the spot. For example, if a mass of women protestors gather and attempt to storm and affect the release of a detained terrorist leader, and further, if AK 47 wielding terrorists wearing burqas and masquerading as women open fire at our troops, what would one do?

Those of us who have faced such situations and emerged unscathed are the 'Unsung Heroes' of this dirty war in J&K and the North East and elsewhere in the world, be it Afghanistan, Yemen, Iraq or earlier in Bosnia. As lives are at stake and being answerable for actions of my command, I would prefer to be in the picture in real time, without interfering with the conduct of the ops or impinging on the freedom of action of the bn or company cdrs concerned. I am convinced that all leaders at the tactical level, up to the rank of brigadier, are field cdrs and should function accordingly. Above that rank, the General Officers should decide for themselves as to when and where their presence would be necessary in the combat zone, so that they could get a feel of the ground, guide the formation and unit cdrs and motivate the troops.

The stakes being so high particularly in J&K at present, that whenever a situation appears to be going wrong or getting out of control and intervention by the higher cdr becomes imperative, it helps tremendously if that the cdr is present nearby. We cannot be oblivious to the fact that, we have an extremely devious adversary across the LoC, a TRP-dictated and at times biased media, and not to forget a hyperactive social media to contend with. One *faux pas* is enough to ignite a storm. No amount of firefighting subsequently can undo the damage once caused. The dynamics of CT ops are so fluid that often events overtake decisions which are tardy. At least that has been my experience on many occasions during my two-year tenure as bde cdr in the valley in which we conducted over a hundred bn or company-plus level ops. I cannot recall even a single fatal casualty on our side from February 1991 to December 1992, whereas we neutralised over 150 to 200 terrorists, many more apprehended and seventy plus who surrendered, with approximately half a bn worth of captured small arms, grenades and ammunition.

General **JJ Singh**, PVSM, AVSM, VSM, ADC (Retd) is former COAS and also served as Governor of Arunachal Pradesh. Views expressed are personal.

Bravest of the Brave

TEAM 22 GRENADIERS

SECOND LIEUTENANT RAKESH SINGH, AC (POSTHUMOUS)

Introduction

Second Lieutenant (2Lt) Rakesh Singh, a man who epitomised the conspicuous act of bravery and intelligence, was the youngest officer to be awarded the Ashok Chakra, India's highest peace time gallantry award. Rakesh was highly motivated to join the Armed forces and serve the nation right from his childhood, because coming from a military background, he was highly impressed by the discipline and the lifestyle of the Armed Forces. Rakesh was good in academics as well as sports, had a very charming and endearing personality and his friends used to call him 'Bobby'. In his journey to serve the nation, he had found the way to the righteous path that would lead him to his goal—a service that was extraordinarily high and supreme.

2Lt Rakesh Singh was born on 18 September 1970 in a military family in Chandigarh. Rakesh was a third-generation soldier, his grandfather Honorary Captain Rattan Singh had participated in some of the fiercest battles in Burma during World War II and he was the son of veteran Army Colonel Raj Singh and Smt Savitri Singh. His father was a Gunner having fought in the 1965 and 1971 Indo-Pak wars. Their medals were framed together and hung on the wall in the living room adjacent to his grandfather's photo in uniform. One day Rakesh, then aged about 10, spoke his heart out "Mummy, one day you will see me in this uniform". And 12 years later, his mother, Savitri Singh, saw her son as 2Lt in olive greens. Youngest of the three siblings, Rakesh did his early school education from Saint Joseph's Boys High School, Kirkee (Pune) and later on studied in Jat Heroes Memorial School, Rohtak. He got selected in the prestigious National Defence Academy and joined the 79th NDA course and got commissioned on 13 June 1992. He was commissioned into the 22nd Battalion, the Grenadiers Regiment. Rakesh, just 21 then, was fondly addressed as "tall baby" by his seniors.

His First Day in Unit

22 GRENADIERS was located at Prisal village of Anantnag district. It was a pleasant evening, on August 5, 1992 and though the weather was pleasant, the atmosphere was hostile and quiet at Arwini. Arwini is a fairly big village in Anantnag district of Jammu and Kashmir (J&K). August was supposedly the most eventful month in the valley, as far as militancy was concerned. The QRT from Prisal had reached Arwini and was waiting for the link of QRT from Khanabal. The Khanabal QRT passed a message that some Rakesh Singh Sahib had arrived and would be brought in soon. ***"'Naya Murga', reception arrange Karo"*** roared Tiger 22. Lion 22 hopped into action and messages started on the network, **"Lima Two over"**, **"Lima Two pass message over"**. The reply **"Wilco over"** conveyed that orders were understood and conveyed by the company commander on Arwini bank for the reception of the new youngster.

The Khanabal QRT arrived at Hassanpur bank and Rakesh, a lover of natural beauty, started strolling along the bank enjoying nature as the trans-shipment of supplies was in progress. About 200 metres downstream in the river bend, no one had noticed the movement of a few shady figures in a boat towards Hassanpur bank. Twilight had set in by then and suddenly there was a shout from the jawan accompanying Rakesh as he was banged on the back of the neck and he collapsed. Before Rakesh could react he was overpowered by four armed Kashmiris, who blindfolded and handcuffed him before dragging him away.

By now Rakesh had realised that he had been kidnapped by Kashmiri militants but was not aware of his destiny. He was then put into a car and driven away. The car stopped after a short distance and Rakesh was then dragged and thrown into a tent with some hay spread on the ground. Suddenly he heard a commanding voice in Urdu ordering everyone to leave him alone. Rakesh could feel somebody approaching him and then sitting next to him. The gruff voice started interrogating Rakesh asking details about the army. Rakesh was totally lost, what could he say? He was clueless of what his interrogator wanted. ***"Nahi Batayega Na"; "Ek Balti Pani lao"*** shouted the interrogator, who seemed to have lost his nerves. Within seconds a pail of water arrived.

Before Rakesh could even realise as to what was happening, he was forced to the ground by a couple of powerful arms and a glass of water was forced down his throat. Rakesh choked and coughed but his interrogator was adamant and forced more glasses of water down Rakesh's throat, shouting ***"Tu Nahi Batayega Na"***. Rakesh had already consumed 10 to 12 glasses of water before the torture with water was stopped. A little food was offered to him, but he was still blindfolded. He was kept under guard throughout the night, however the "kind" militants offered him a blanket. Rakesh sat in his tent trying to reconcile from the shock but as the night progressed, exhausted and engrossed in his thoughts, he dozed away.

The chirping of birds informed Rakesh it was morning and he was again hauled by two persons shouting ***"Uth Commander ke pass chalna hai"***. Still blindfolded and handcuffed, he was escorted somewhere. He was taken into a room which he guessed rightly as the Commander's room. ***"Patti aur Hatkadi kholo"*** roared a voice and two obedient executors immediately carried out the order. Rakesh slowly opened his eyes with great difficulty as his eyes had been covered since the previous evening. He could see faintly but couldn't believe his eyes of what he saw in front of him. He once again rubbed his eyes and tried to take in what he was seeing. Sitting on a revolving chair was "Tiger 22" with an extended hand and said, **"Welcome to the folds of BAEES Rakesh"**.

Even in such an extreme situation of his kidnapping, Rakesh had remained calm and unwilling to share any information. This aspect had not gone unnoticed by his abductors and was an insight into his personality. But little did anybody know that this young 'grinder' was destined to become a "HERO" by laying down his life for the Nation, be decorated with the most prestigious "ASHOK CHAKRA" and bring laurels to the battalion and the regiment.

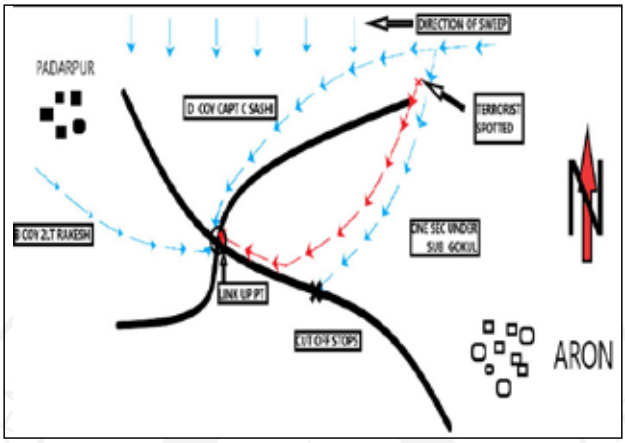
The Journey of the Hero

From the very beginning, 2Lt Rakesh Singh displayed the confidence, enthusiasm and tenacity which is so distinct of men born to lead. In his first few days in the unit, he led his team successfully against a scouting party of eight hardcore militants, who tried breaking the cordon established by the neighbouring battalion of 11 RAJRIF in 'OP Shupian'. Rakesh was the commander of the advancing party and after a visual contact with the terrorists, he signalled his troops to hold fire and allowed the terrorists to close in (similar to the tactics used by a lion to hunt down his prey). Due to controlled fire orders and effective leadership, four terrorists were apprehended on the spot with another terrorist chased and apprehended. The remaining three were apprehended later in night which led to the recovery of 4 AK-56 rifles, 4 magazines, 48 rounds of ammunition and 2 hand grenades. The operation was only the beginning of the men being imbedded into the thick of insurgency in J&K. In another operation in Maladera, that was flawlessly executed by his team, led to recovery of 2 AK-56 rifles, 7 magazines besides 200 rounds of belted ammunition and 19 detonators and explosives.

In Wuthamul Village, the young braveheart led his team against two hardcore terrorists who had taken shelter there and were onto something big on the eve of Eid, to scare the local population and gain popularity for their organisation. The terrorists were not aware of the fact that they were in the area of the 22 GRENADIERS, known for their terrorist hunting capabilities. The search party led by the young 2Lt Rakesh Singh successfully eliminated both the terrorists and recovered 2 AK-56 rifles, 2 magazines and 50 rounds of ammunition. Following these successful operations, in the days ahead the young officer led his troops in a spectacular way and became an expert in the Counter-Insurgency (CI) operations. Everyone knew that he would do something big one day.

The Ultimate Sacrifice

THE PLAN



In 1992, 22 GRENADIERS was deployed in J&K for CI operations and the unit's area of operations was the hotbed of militant activities. On December 5, 1992, 2Lt Rakesh, as the commander of 'B' Company, was given the responsibility for blocking the escape of terrorists who had carried out an attack in Shopian Tehsil in Pulwama District and were now escaping to their hideouts. While organising his troops at west of Paadarpur Village, 2Lt Rakesh received information on his radio set from Captain C Sashi, Company Commander of 'D' Company that around 7 am, the terrorists had reached the south of the village after fleeing from the attack site.

Rakesh realised that though he was short of troops, he could block the terrorists from escaping by reacting promptly, and after a quick decision he showed immense courage and rushed to the spot to block their escape. On being challenged, the terrorists fired at Rakesh and his troops with automatic weapons, but an 'unfazed' Rakesh counter attacked and killed two terrorists. Facing a determined attack from the troops, the terrorists started to flee, but one of the soldiers of Rakesh's company managed to block their escape route. On seeing his fellow soldier in danger, 2Lt Rakesh Singh attempted to reach a vantage point to attack the fleeing terrorists and ran right through a barrage of gunshots. He was hit by a burst in his shoulder and arm in this process. Undaunted, the braveheart got up and fired back killing three more terrorists.

Inspired by the exemplary courage of their young company commander, the soldiers fought with renewed vigour and killed the three remaining terrorists. The mission was accomplished successfully and eight terrorists were eliminated under the inspiring leadership and daredevilry of 2Lt Rakesh Singh. Unfortunately, Rakesh had suffered grievous injuries during the gun fight and was immediately evacuated. But sadly, later in the day, Rakesh succumbed to his injuries and was martyred. 2Lt Rakesh Singh was posthumously awarded the nation's highest peacetime gallantry award—the "Ashok Chakra"—for his raw courage, outstanding leadership and supreme sacrifice on the line of duty.

Col Raj Singh, father of 2Lt Rakesh Singh receiving the Ashok Chakra from the President

The Citation of Ashok Chakra Awarded to 2Lt Rakesh Singh Reads:

On December 5, 1992, 2Lt Rakesh Singh's company was assigned the task of cutting off the escape route of eight fleeing Afghan Mujahedeen, flushed out during operation. In the process, exemplifying the spirit of aggressiveness he single-handedly killed five of the retreating Mujahedeen before succumbing to fatal injuries sustained during the operation. In recognition of his brave and selfless act he was awarded posthumously the nation's highest peace time gallantry award the "Ashok Chakra".

Conclusion

IC-51242L 2Lt Rakesh was just 22 years of age when he made the supreme sacrifice in the glorious traditions of the Indian Army where young officers always lead from the front and follow the Chetwode motto to heart. His stirring leadership, camaraderie with his fellow soldiers and courage was a shining example for young soldiers to emulate. 2Lt Rakesh Singh firmly upheld the timeless dictum of ***"Naam Namak Nishan"***—Reputation of the Paltan, Fidelity to the salt and Loyalty to the Flag.

The heart-warming account has been contributed by **TEAM BAEES (22 GRENADIERS).**

SCHOLAR WARRIOR

SECTION V

COMMENTARIES AND BOOK REVIEWS

CENTRE FOR LAND WARFARE STUDIES

Commentaries

Centre of Gravity Construct: Mechanics, Manifestation and Imperatives for the Indian Armed Forces

KUNENDRA SINGH YADAV

As the Israeli failure in Lebanon conflict of 2006 conclusively shows, the so called diffused warfare cannot replace the traditional focus on the enemy centre of gravity.[1]

—Milan Vego

Introduction

Technology and warfare are known to be innately intertwined. As technology evolves, it brings about a relative change in the character of warfare, thereby mandating the onus of keeping warfare sound, relevant, contemporary and nuanced. Certain concepts however, remain destined for perpetuity as far as their utility within the continuum of conflict is concerned. The Centre of Gravity (CoG) construct is one such paradigm which, though old, still weighs its "weight in gold" as a war-waging tool at the disposal of a military Commander.

As rising non-traditional security challenges such as COVID-19, caused unprecedented ire, anxiety and losses across the globe, concepts such as CoG

analysis, which are applicable to tackling threats of 'military' as well as 'non-military' nature, holds huge promise and potential for the mankind. Talking of war, the concept testifies as one of the most vital ingredients of Operational Art, influencing brains on the battlefield through its disruptive impact and scientific design. Desire for greater analytical coherence on this "widely heard—lightly understood" paradigm beckons us to dive deep into its conceptual realm. So let us commence from the past.

Latent Past and the Present Relevance

The idea of hitting the decisive capability of the adversary so as to paralyse him psychologically dates back to prehistoric times. Chanakya said, "If we conquer all our enemies by conquering one of them, then the defeat of that one should be the aim of war".[2] Sun Tzu, on the other hand, talks at length about "Targeting the enemy's weakness instead of strength" or "Winning without fighting". More recently, Clausewitz articulated, "CoG is the hub of all power and movement, on which everything depends. It is the point against which all our energies should be directed".[3] The utility of CoG phenomenon and its unmindful application seems to be ubiquitous today, ranging from 'as usual an affair as cricket' to 'as serious a stuff as warfare'. The Australian Defense doctrine publication states:

> *The essence of operational art lies in being able to produce the right combination of effects in time, space and force and purpose to neutralize, weaken, defeat or destroy an enemy's centre of gravity.*[4]

Interplay with Operational Factors

Viewing operational art through the lens of CoG concept highlights credible takeaways towards battlefield exploitation of the operational factors of Time, Space, Force and Information.

- ***Time:***[5] Answering questions such as 'When to Fight', 'How long to fight' will assist mindful targeting of the enemy's CoG at successive levels in a time-synchronised manner, thereby achieving victory before one's own culminating point is reached.
- ***Force:***[6] CoG approach confers the unique privilege of victory to a numerically inferior side, through correct application of force, at the point of decision.
- ***Space:***[7] Targeting CoGs at successive levels will ensure control over spaces critical to the enemy, thereby inhibiting his aim and facilitating own aim.

- ***Information:***[8] CoG analysis will render the planner with critical information, required for skilful exploitation of the Time, Space and Force factors.

Key Pay-offs: With such established relevance of the CoG concept, we can safely attribute the following pay-offs to this proverbial game changer:

- Economy of effort by applying just the right quantum of force against carefully selected targets.
- Focused approach by discarding peripheral activities, not contributing directly to the intended line(s) of effort.
- Coordinated planning and execution by synergetic execution at strategic, operational and tactical levels.
- Salience of intangible aspects like leader, ideology, popular support unlike the traditional war fighting approach.
- Cross-spectrum applicability covering military as well as non-military threats.
- An overall sound, rational and scientific approach to warfare, is a corollary to the above pay-offs.

Conceptual Comprehension and Overview at Strategic and Operational Levels

"Logic of Strategy", that is less can be better than more.[9]

—Edward Luttwak

CoG Identification and Exploitation:[10] To gain a holistic understanding of CoG analysis process, it is advisable to adopt a 'Systems Approach' wherein the entire functional anatomy of the adversary is understood to work as a system. There are two phases to the whole CoG approach. The first is to identify own/enemy's CoG and the second being to analyse it for further protection/exploitation. One's own CoG needs to be protected while that of enemy needs to be targeted.

- ***Phase I–Identifying enemy's CoG:*** This could be understood through the 'Ends–Ways–Means' trinity as follows:
    - ***Step I–Ends:***[11] What is the End State desired by the enemy i.e. what is the enemy's objective. This is the most important step from which everything flows. An incorrect assessment of enemy's goal/aim will render the whole analysis process flawed, resulting in a defective plan and eventual defeat.

- ***Step II–Ways:***[12] Way(s) denotes functional expertise/ability to achieve the desired ends. These could also be called 'Critical Capabilities'.[13] Out of these, the most important one is selected.
- ***Step III–Means:***[14] Means are resources/doers of actions. Initial action under this step will be to crystallise the possible means necessary to accomplish the most critical capability/way selected above. Then the most important means, having an inherent capability to accomplish this most critical capability (homed on in Step II) or the 'Decisive Doer', will be the CoG we are looking for.

- ***Phase II:*** Having found the adversary's CoG, the next major step is to follow a three-step logical process to target the same.
  - ***Step I–List Critical Requirements:***[15] This step flows out from Step III of phase I i.e. finding the means. Out of all the means, the one with an inherent capability to execute the task is the CoG, whereas the balance means will be the critical requirements which supports the CoG towards accomplishing the task.
  - ***Step II–Find Critical Vulnerabilities:***[16] After finding the critical requirements, a need arises to home on to the crucial vulnerabilities of these critical requirements. All requirements may or may not have vulnerabilities, however the skill here lies in selecting those which will make the CoG untenable or make it dysfunctional.
  - ***Step III–Target Decisive Points:***[17] Decisive points could be either locations or events which are gateways for attacking the CoG or exploiting the critical vulnerability of the decisive critical requirement that makes the CoG function.

Post navigating the methodology to find and exploit adversary's CoG towards meeting own operational aim, let us now see the characteristics of CoGs at strategic, operational and the less talked about tactical level.

CoG at Strategic, Operational and Tactical Level

- ***Strategic Level:***[18] A CoG at strategic level will be of an intangible nature, such as an ideology/belief that unites a nation or binds a coalition, a leader whose leadership becomes a source of strength for a nation/army, economic clout of a nation that imparts it the political legitimacy/moral ascendency in the comity of nations. During the Vietnam War, inability of the US to first identify correctly and then protect its Strategic Centre of Gravity i.e. 'Public support

for the war effort'[19] (an intangible) cost them the war. Victory was thus conferred to the lesser opponent. It is said that the US was not 'Out Fought', rather it was 'Out Thought'.

- ***Operational Level:***[20] An operational level CoG on the other hand, will more often assume a tangible nature. It may, at most occasions, represent the 'mass of enemy force' with considerable inherent combat potential and flexibility. A systematic degradation of CoG at operational level will have a corresponding weakening effect on the strategic CoG of the adversary and vice versa. During the 1967 Arab-Israel War,[21] Egyptians failed to protect their operational CoG (superior Air Force) from a pre-emptive Israeli airstrike, leading to total decimation of their air resources. The physical and psychological impact of this air raid, laid the ground for eventual victory of Israel during the war.
- ***Tactical Level Nuances:*** A parochial school of thought underscoring absolutism and rigidity suggests applicability and efficacy of CoG concept mainly at strategic and operational levels.[22] Succeeding arguments however justify its credence at the tactical level.
    - *Symbiotic Relation:* It is said that strategy without good tactics is the slowest route to victory.[23] More so, a concept/approach can only bear optimum results at the strategic and operational levels, if it has been weaved carefully at the tactical level without any preconceived prejudice.
    - *Acupuncture Effect:* Targeting thoughtfully evaluated CoG(s) at tactical level (having operational relation) will have a cumulative effect on the adversary's operational CoG. Same is obtained in theory of acupuncture where a coordinated pressure at various body points produces an overall desired effect. These tactical CoG(s)/acupressure points have to be selected carefully and targeted in relation to the enemy's operational CoG.
    - *Launchpads for Operational Victory:* Defeating an adversary's tactical CoG will in effect act as a launchpad for further envisaged success at operational and strategic levels.[24]
    - *Flexibility:* Flexibility/redundancy in plans is the best assurance for success in battle. Stakes at the tactical level are not that high as compared to a corresponding miscalculation at the operational and strategic level, in which case, it becomes difficult to undo an act.[25]

- *Technological Amiability:* Objectives or perceived COGs at the tactical level are more amiable to application, support and exploitation of technology. The ambit and scale of operations being small at this level, a compact, coordinated and impactful employment of a decisive technology, duly complementing the tactical plan, will produce decisive results.

Having convincingly established the past existence, present relevance and future worthiness of this concept, embracing it holistically in the Indian context may still exhort a close quarter analysis. The undermentioned imperatives are worth considering in our environment.

Environment Imperatives for Indian Armed Forces

- ***Non-Traditional Security Threats:*** Ever rising threat from Non-Traditional Security Challenges remains the defining trend of 21st Century. Militaries across the world are and will remain at the forefront while combating these problems. Encountered with similar scenarios in future, demands the ability to 'Think on your Feet' and act smartly. A scientific and rational counter approach based on thoughtful appreciation and analysis will hold the key to such situations.
- ***Cognitive Culture:*** The current time and space are favourable to militaries with greater grey-matter tendencies. A vanguard of thinkers and visionaries (civil and military) spearheading the national force evolutional endeavours, will ensure that we remain afloat in the contemporary era. Towards this, vigorously imbibing a cognitive culture among the military youth of our force will go a long way.
- ***Mindset Reorientation:*** Our quest for operational reconnaissance and excellence mandates a reorientation. Our default operational focus leans westwards. This serves the agendas of our Western and Northern Adversaries simultaneously. It also severely limits our organisational foresight, both conceptually and materially. Going by the government's endeavour to 'Act East–Think West', the military now needs to 'Focus North' in a way that 'North' becomes the benchmark for our current and envisaged military standards. We may lack resources, but this should not restrict our vision. As the saying goes—"If the vision is firm means will manifest".
- ***Seeking Assassin's Mace:*** Current and future military engagements will be time and space compressed. This calls for skill at short conflicts wherein

innovative concepts enmeshed with cutting-edge technologies will be the crucial enabler for securing victory. Selective arming of specific formations with disruptive, indigenously developed niche military technologies will be the 'Assassin's Mace' required to secure quick victory over a clever adversary. Apparently, CoG concept mandates the military to have such technologies.

- ***Customisation vs Standardisation:*** Standard application of any concept across the spectrum of conflict may not serve the purpose. We need to customise application of CoG and similar new concepts to our operational conditions keeping the terrain and enemy peculiarities in mind.
- ***Training:*** At the functional level, skilful application of any concept results from its in-depth understanding. Early introduction and visible exploitation of the concept in military planning from tactical level and upwards will facilitate greater dividends.

Conclusion

In the current era of Asymmetric Warfare, even being a superpower is no guarantee for success on the battlefield. Logical and innovative thinking will hence form the lynchpin of military effectiveness across dynamically evolving security scenarios. Therefore, as a nation, our approach to warfare needs to be carefully calibrated between the traditional military inclination for 'muscle and brazen force' on one hand and the increasingly relevant characteristics of 'wit and guile' on the other. Lacking the luxury of warring with 'big bang budgets' and 'whiz bang technologies', we would do much better by applying our conventional wisdom in the most unconventional and ingenious manner as feasible. In view of the above, one can surmise that the CoG concept holds promising relevance for an aspiring military faced with concomitant challenges on multiple fronts.

Major **Kunendra Singh Yadav** is presently serving in a Corps HQ. Views expressed are personal.

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Biological Warfare and Bio-Terrorism

ANIL CHOPRA

Introduction

The world is facing one of the biggest humanitarian crisis, and the coronavirus outbreak has literally brought the earth to a halt. As the COVID-19 pandemic continues its destructive course, various theories of its origin are doing the rounds. Could the pandemic have been the result of an accident at a bio-safety level 4 laboratory in China's Wuhan city?[1] Could the virus be a bio-weapon? Could it have been a biological attack by China in order to position itself as the single greatest superpower, while flattening its rivals' industrial and economic capacity? Could the virus have originated in the seafood market? Does the virus have any connection with the use of 5G communications? And of course there is a passage from the 1981 book *The Eyes of Darkness* by Dean Koontz which eerily predicts the coronavirus outbreak.[2] Notwithstanding the origin of this virus, the world has a history of developing and using biological weapons against adversaries. Globalisation and better connectivity have shrunk the world in time and space, hence the spread of any virus would now be much faster.

A biological weapon in the hands of terrorists could be used for Bio-Terrorism to eliminate a sizeable population. Biological warfare and Bio-Terrorism are thus of grave concern to the entire humanity. The 2011 American thriller film *Contagion* was in relation to spread of a virus and very realistically showed attempts by medical researchers and public health officials to identify and contain the disease, and the loss of social order in the pandemic.

The film received renewed popularity during COVID-19. Bill Gates said in a 18 February 2017 Business Insider op-ed that, it is possible for an airborne pathogen to kill at least 30 million people over the course of a year.[3]

Biological Warfare

Biological warfare (BW) is the use of biological toxins or infectious agents such as bacteria, viruses, insects, and fungi with the intent to kill or incapacitate humans, animals or plants as an act of war. Bio-agents are living organisms or viruses which are often not considered as "alive". BW is distinct from nuclear, chemical and radiological warfare, which together with biological warfare make up CBRN, a term that militaries often use for weapons of mass destruction (WMD). Biological weapons may be employed in various ways to gain a strategic or tactical advantage over the enemy—either by threat of use or by actual employment. Biological weapons can act like an area denial weapon. The BW agents may be lethal or non-lethal and used against an individual or a group of people, or even an entire population. The use of biological weapons is prohibited under customary international humanitarian law and is also covered by many international treaties, and the use of biological agents in armed conflict is a war crime.

Bio-Terrorism

This is a type of terrorism involving the 'intentional' release of biological agents such as viruses, bacteria, toxins or other harmful agents to cause illness or death in people, animals, or plants.[4] These agents could be found in nature, or mutated or altered to increase their ability to cause disease, make them resistant to current medicines, or to increase their ability to spread into the environment. These could be spread through air, water, or food. The agents could be attractive to terrorists as they are very difficult to detect. Some agents like the smallpox virus, spread from person to person and some, like anthrax don't. Bio-terrorism is favoured because biological agents are relatively easy and inexpensive to obtain, spread, and can cause great fear and panic.

Types of Agents and Employment

Bio-agents that have the "potential to pose a severe threat to public health and safety" are officially classified in United States under categories (A, B or C).[5] Category-A agents can be easily transmitted and disseminated, results in high mortality, have have potential of a major public health impact, may cause public

panic, or requires special action for public health preparedness, and pose a risk to national security. These include Tularemia (rabbit fever) that has a low fatality rate if treated, but can severely incapacitate. As a weapon, the bacteria could be made airborne for exposure by inhalation, and cause severe respiratory illness. Anthrax can cause abrupt symptoms within 24 hours of exposure. An anthrax vaccine does exist, but requires many injections for stable use. If discovered early, anthrax can be cured by antibiotics. The first modern BW used was by the Germans against the Imperial Russian Army in Finland in 1916.[6] Anthrax is one of the few biological agents that US' federal employees have been vaccinated for. Smallpox is also a highly contagious Category-A virus. It is transmitted easily through the atmosphere and has a high mortality rate (20-40 per cent).[7] Smallpox was eradicated in the 1970s, however, some virus samples are still available in Russian and American laboratories. Disastrous consequences are feared if terrorists were to get hold of the smallpox strains. Since vaccination programs are now terminated, the world population is more susceptible to smallpox. The Neurotoxin Botulinum is the deadliest toxin known to man.[8] Botulism causes death by respiratory failure and paralysis. The toxin is readily available worldwide, due to its cosmetic applications. Hemorrhagic Fevers, caused by Marburg and Ebola virus, have caused an average of 50 per cent fatality rates. No cure currently exists, although vaccines are in development. There are many Category-B agents that are easy to disseminate but have low mortality rates. Category-C agents are emerging pathogens that might be engineered for mass dissemination because of their availability, ease of production, and the ability to cause major health impact.

Synthetic Agents

Terror groups like ISIS could possibly develop a synthetic BW agent and introduce it to the world, to kill civilians.[9] The synthetic strains could render a vaccine ineffective, have resistance to therapeutically useful antibiotics, could enhance the virulence of a pathogen or render a non-pathogen virulent, could increase transmissibility, could enable the evasion of diagnostic/detection tools, could enable the weaponisation of a biological agent or toxin. While "Gene Editing" is being developed as a tool for cure, it could also be misused.

Early Examples of Biological Weapons

In the third and fourth century BC, Scythian Archers and Hannibal of Carthage Army, used to infect their arrows by dipping them in snake venom.[10] The use of

arrows for the transmission of plague is suggested in documents of 1437. Plague was transmitted by the Mongols by throwing 'diseased cadavers' with catapults. In 1650, the Polish Army fired saliva from 'rabid dogs' towards their enemies.[11] In 1763, British officers distributed blankets from smallpox hospitals to Native Americans. In 1797, the Napoleonic Armies flooded the plains around Mantua (Italy), to enhance the spread of malaria among the enemy.[12] Clearly, smallpox represented the most effective, if purposefully used, biological weapon during "pre-microbiological" times.

BW in Post-Microbiological Era and Geneva Protocol

Microbiology was evolved in the end of the 19th century by Louis Pasteur, Robert Koch, and their followers. It gave scientists the possibility of systematically isolating and producing specific pathogens on a large scale. Nations involved in World War I, especially Germany and France, ran secret BW programs. BW combined with the chemical warfare being used on the battlefield, for the first time, became a major political concern.

Anthrax is an infection caused by bacteria that can enter through skin, lungs, intestines or injection.[13] It had been developed and tested by World War I. Shortly after the start of WW I, Germany launched a biological sabotage campaign in the United States, Russia, Romania, and France through a virulent disease among horses and mules. Germany and its allies infected French cavalry horses and many of Russia's mules and horses on the Eastern Front.[14] This hindered artillery and troop movements, as well as supply convoys.

As a consequence, the *Geneva Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare* was ratified in 1925, which prohibited the use of BW, but not their research and production.[15] States that had ratified the Geneva Protocol, such as France, the UK, Italy, Canada, Belgium, Poland, and the Soviet Union, began research on BWs; so did the USA, which did not ratify the Geneva Protocol until 1975.

Japanese Army Unit 731

During the interwar period, the Japanese began to develop one of the most systematic and ambitious BW programs. They created the dreaded 'Army Epidemic Prevention Research Laboratory Unit 731' in 1932.[16] Japanese scientists subjected prisoners to different kinds of experimentation—human subjects were inoculated with organisms and then left untreated, in order to study the effects. Dropping of

plague-infected fleas, infected food and clothing by aircraft into areas of China, that were not occupied by Japanese soldiers, was resorted to. Several thousands of people (including several Japanese soldiers) died as the result of these attacks.

BW in World War II

The Nazis also performed research but they apparently never considered using BW during World War II. The USA also carried out BW research, and in 1942, created the 'US War Research Service for BW'. After World War II, the US government granted immunity against prosecution for war crimes to the Japanese Unit 731 leaders in exchange for the knowledge gained through their experiments. Samples from these tests were also collected by Soviet spies, which furthur helped the Soviet Union to further develop its own BW program.

Cold War Years

Many (mostly unsubstantiated) allegations of BW attacks were made in the context of the Korean and Vietnam wars, and the Afghanistan invasion. There were allegations that Great Britain had used biological weapons in Oman in 1957. The Chinese alleged that the USA caused a cholera epidemic in Hong Kong in 1961. In July 1964, the Soviet newspaper *Pravda* asserted that, the US Military Commission in Colombia and Colombian troops had used biological agents against peasants in Colombia and Bolivia. In 1969, Egypt accused the "imperialistic aggressors" of using biological weapons in the Middle East, specifically causing an epidemic of cholera in Iraq in 1966.[17] Under pressure from the World Health Organization (WHO), the new *Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction (BWC)* was signed in 1972[18] by over 100 nations including the USA, UK and Soviet Union. However, the existence of the BWC did not prevent various states from developing BW research programs. Iraq, under the dictatorship of Saddam Hussein, initiated a BW program.

In 1981, USA accused the Soviet Union of supplying T-2 mycotoxin to Vietnam, Laos and Kampuchea (Cambodia) for use in counter-insurgency operations.[19] Planes and helicopters delivered aerosols. People who were exposed, became disoriented and ill. These attacks were commonly described as "yellow rain". During 'Operation Desert Shield', in 1990, the USA and the coalition forces faced the threat of biological and chemical warfare in Iraq. In preparation, approximately 150,000 US troops were administered toxoid vaccine against anthrax, and 8000 received a new botulinum toxoid vaccine.[20] For further

protection against anthrax spores, 30 million 500-mg oral doses of ciprofloxacin were stockpiled, to provide a one-month course of chemoprophylaxis for the 500,000 US troops that were involved in the operation.

Civil Bio-Terrorism Cases

In 1972, police in Chicago arrested two college students who had planned to poison the city's water supply with typhoid and other bacteria. In 1984, followers of Bhagwan Shree Rajneesh attempted to control a local election by incapacitating the local population by infecting salad bars, grocery stores, doorknobs, and other public areas with certain bacteria in Oregon.[21] The attack infected 751 people with severe food poisoning. However, there were no fatalities. This incident was the first known bio-terrorist attack in the United States in the 20th century. It was also the single largest bio-terrorism attack on US soil. In June 1993, a religious group released anthrax in Tokyo. Eyewitnesses reported a foul odor. The attack was a failure, because it did not infect a single person.

In September and October 2001, several cases of anthrax broke out in the United States, caused by letters laced with infectious anthrax concurrently delivered to news media offices and the US Congress. The letters killed five. The anthrax laced letters killed a 62-year-old photojournalist, Bob Stevens, and four others in October 2001,[22] and pushed the already shell-shocked USA (after September 11 attacks), into a new security challenge, that of bio-terrorism. In early 2002, President George W. Bush announced US$ 11 billion, funding a decade-long program to tackle bio-terrorism.

Typical Bio-Terror Attack Scenarios

Attacks in densely populated indoor spaces like large buildings, trains, indoor arenas, theatres, malls, tunnels are much more serious than outdoor attacks. Countermeasures against such attacks are better ventilation systems. Terrorist prefer to deliver agents at points of delivery. A locality or building water tank could be a target. Agricultural crop-spray flights might be misused as delivery devices. Spreading hoax through calls and social media of bio-attack could produce a large psychological impact on people. Attacking agriculture, livestock or fisheries can spread infections.

Detection, Response and Bio-Defence Strategy

Strategies in most countries are geared to protecting soldiers on the battlefield rather than ordinary people in cities. There is a need for export controls on

biological agents. Forensic technologies can help identifying biological agents, their geographical origins and/or their initial source. Laboratories are working on advanced detection systems to provide early warning of contamination. Decontamination technologies are constantly being evolved. Health authorities, internal security and defence are key departments that need to act.

The rapid globalisation, international and cross-regional travel, and urbanisation, increases scope and risks for bio-terrorism. Responsible nations must have a clearly spelt out 'Bio-Defence Strategy'. It has to include detection, medical response, border controls, movement controls, security procedures, and execution plans. Advanced Generation-3 automated detection system can enable action in four to six hours due to its automatic response system.[23]

Bio-Surveillance

Biomedical information can be used for automated bio-terrorism detection. USA has RODS[24] (Real-Time Outbreak Disease Surveillance) that is a bio-surveillance system. RODS collects data from many sources, including clinic data, laboratory data, and data from over-the-counter drug sales. This gives indication of a disease outbreak or can link to a possible bio-terrorism event. Health-related data such as that from hospital computer systems, clinical laboratories, electronic health record systems, medical examination records, veterinary medical records, could be of help. Some research shows that ultraviolet avalanche photodiodes could help detect anthrax and other bio-terrorism agents in the air. The United States Department of Defense (DoD) conducts global bio-surveillance through several programs.

Response to Bio-Terrorism Incident or Threat

The first responders to bio-terrorism incident would be the law enforcement agencies, hazardous materials & decontamination units, and emergency medical units. In India, local health authorities, security agencies and National Disaster Response Force (NDRF) would be the first responders. There are special bodysuits that can protect the first responders and patients from chemical and biological contaminants. There are also Self-Contained Breathing Apparatuses (SCBA) which are robust against bio-terrorism agents. There is a need for regular simulated exercises by various first responders in different cities. Each state must have earmarked dedicated, trained teams. There should be specially created training and simulation centers at national and state level. Medical countermeasures for bio-threats should be well established. The Ministry of

Defence (MoD) needs to do its own research in DRDO labs for safeguarding troops and military stations. The private sector needs to be involved in evolving and countermeasures. Biological and chemical weapons are probable and relatively easy to disperse. The efficiency in preparedness against bio-terrorism is less about money and more about correct allocation and preparation. The mishandling of the Ebola virus outbreak in 2014, and mixed response to COVID-19 are indicative of lack of global preparation.

Awareness and Specialised Military Units

Militaries of major nations have specialised units, which can respond to a bio-terrorism event. These units handle chemical, biological, radiological and nuclear (CBRN) defence. All the US Armed forces have special training for soldiers pursuing a career in CBRN. The US Marine Corps' Chemical Biological Incident Response Force, and the US Army's 20th Support Command can detect, identify, and neutralise threats, and decontaminate victims exposed to bio-terror agents. All the US Navy personnel take web-based CBRN e-training annually to get a basic understanding. Russia has the Nuclear, Biological and Chemical Protection Troops (NBC Protection Troops). The Indian Army has 16 CBRN monitoring vehicles.[25] These are developed by DRDO and manufactured by Ordnance Factories. Indian Air Force and Navy also have means to secure their airfields and installations from CBRN threat and educate their personnel and carry out drills.

Conclusion and Way Ahead

BW remains a threat to the public sphere that has to be taken seriously and responded to without overreaction at both individual and political levels. Public awareness is increasing, but a lot more needs to be done. Bill Gates has warned that bio-terrorism could kill more people than nuclear war. The next weapon of mass destruction may not be a bomb. Biological warfare agents may be more potent than conventional and chemical weapons. The recent progress in biotechnology and biochemistry has simplified the development and production, and have led to a further spread of biological weapons and an increased desire among developing countries to have them. Because of the increased threat of terrorism, the risk posed by various micro-organisms needs to be evaluated. Genetic engineering also holds dangerous potential, but may also provide solutions. As long as there are no concrete provisions for enforcement, the BWC will remain a 'toothless' instrument in the hands of the UN Security Council. Countries have

to prepare for the worst and also need to allot more funds for detection and response to bio-terrorism.

Air Marshal **Anil Chopra**, PVSM, AVSM, VM, VSM (Retd) is a test pilot who commanded the Aircraft and Systems Testing Establishment (ASTE) and was a pioneer of the Mirage 2000 fleet. Views expressed are personal.

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Book Reviews

Unrestricted Warfare

Qiao Liang and Wang Xiangsui

PLA Literature and Arts Publishing House, February 1999

One cannot help but marvel at the philosophical depth, incisive insight, almost prophetic foresight, and in-depth research presented in 'Unrestricted Warfare'—a United States (US) Foreign Broadcast Information Service's English translation of select sections of the original book *Chao Xian Zhan: Dui Quanqiu Hua Shidai Zhanzheng yu Zhanfa de Xiangding* (Warfare Beyond Rules: Judgement of War and Methods of War in the Era of Globalization), written by the then People's Liberation Army (PLA) Air Force Senior Colonels Qiao Liang and Wang Xiangsui. It is apposite to mention here that they were part of the Chinese military exercise which prompted the US to send two aircraft carrier groups to the area during the Third Taiwan Strait Crisis.[1] This motivated them to write the book, subsequently published in February 1999 by the PLA Literature and Arts Publishing House.

In the book, the two Senior Colonels deliberates on the changes in warfare and its future, which is the central premise of the book. They also mention the effects of technology, pop culture, simulated training, and remote warfare on soldiers. In fact, examining the battle formation of the Mongol cavalry and the timing of the Battle of Stalingrad, the authors very beautifully bring out the applicability of the "Golden Ratio"[2] in warfare! They pose complex questions regarding the attribution, ethics, and nomenclature in the wars of the future—something that experts are still grappling with in the 21st century. For instance, the authors ask whether the use of information-guided bio-weapons to attack a bio-computer would count as bio-warfare or information warfare, or whether

a single cyber attack would count as a hostile act. The 'surgical strikes', carried out by India in 2016, are still fresh in our minds, but this book raised the issues of surgical strikes being carried out below the threshold of war, assassination of financial speculators, special funds for lobbying, and gaining control of stocks to turn another country's media into the tools of warfare, at the turn of the last century! *Unrestricted Warfare* also brings to light the issues of technological integration and globalisation, and quite presciently states that biotechnology, materials technology, and nanotechnology would play an important role in the future. It further states that no single technology or weapon system can drive the next revolution in military affairs (RMA). One can relate this to the Chinese pursuit of *Zhishenquan*[3] in recent times and the establishment of the Central Commission for Military-Civil Fusion Development in 2017.

While examining the concept of war, especially the changes in its scope, actors, and instruments, the authors predict a trend towards the 'civilianisation' of war, characterised by it being low-casualty yet high-intensity. Soldiers would not have monopoly over war and there would be no distinction between what is and what is not the battlefield. Spaces in nature (the ground, the seas, the air, and outer space), social spaces (the military, politics, economics, culture, and the psyche), and the technological space, linking these two spaces would become battle spaces. This trend would be reinforced by aspects of economics, human rights, and environmental protection. Based on the analysis of the events of the last ten years of the 20th century, the authors forcefully bring out that, military threats are no longer the major factors affecting national security. Hence, the thought-process that assesses the enemy's strength, based solely on the military power, is flawed.

Discussing the new form of warfare, the authors elaborate on the financial attack on East Asia by George Soros, the terrorist attack on the US by Osama bin Laden, and the gas attack in Japan by Aum Shinrikyo, and states that, a relative reduction in military violence is accompanied by an increase in political, economic, and technological violence. Of particular importance is the role of non-state entities and transnational groups, which the authors bring out with the help of an example of the government of Albania which was brought down by transnational groups.

The authors discuss in detail the military, trans-military, and non-military methods of operation, elucidating how domains such as politics, economics, material resources, environment, outer space, and so forth would be essential for modern, sovereign nations. They bring out the difference between 'non-

military war operations' and 'military operations other than war' (MOOTW) and praise the US' approach of MOOTW as creative and practical. In fact, MOOTW finds significant mention in the Chinese White Papers on Defence. The book lists myriad ways of prosecuting non-military wars: trade war, financial war, new terror war (i.e. terrorists possessing high-end technology), ecological war, smuggling warfare, psychological warfare, media warfare, drug warfare, resources warfare, economic aid warfare, international law warfare, cultural warfare, technological warfare, and fabrication warfare. While reading this, one is reminded of the 'Three Warfare strategy of China' involving psychological operations, media manipulation, and exploitation of the legal systems. In fact, as part of economic warfare, the authors mention currency manipulation, moulding public opinion, and changing rules—classic, Chinese tactics!

While talking about the omnipresence of both information and battlefield in the future, the authors beautifully differentiates between "weapons of new concept" and "new concepts of weapons", stating that the latter involves creating weapons that are closely linked to the lives of the common people. Creative thinking can turn anything into a weapon. However, the authors believe that it is not weapons alone, but active innovation that ushers in changes in the nature of the battlefield. In this regard, they describe the approaches of Fuller, Douhet, Tukhachevsky and Ludendorff.

While the authors have examined wars ranging from those in ancient China between the kings of Qin and Zhao, the Battle of Trafalgar, the World Wars, the Yom Kippur War, to the Vietnam War, however, they seem particularly impacted by the Gulf War (Operations Desert Storm and Desert Shield). Analysing the Gulf War in great detail, the authors bring out how it demonstrates aspects such as shared responsibility for military outlay, psychological warfare, making media (CNN broadcasts) integral to warfare, cross-combination of vintage and modern weapons and platforms, groundbreaking reforms of the Air Force command, and real-time coordination of numerous weapons over geographically distant areas and coordination of space based systems and C3I systems. This perhaps explains the Chinese focus on space and the BeiDou navigation system. The authors refer to the integrated air campaign, that blended all the combat operations, as the highlight of the war. In the light of the role and the number of helicopters deployed, the authors believe that attaching the helicopter force to the armoured and mechanised units and other troops, rather than forming a complete helicopter army, was reflective of the lack of American ingenuity. According to the authors, Saddam Hussein's invasion of Kuwait provided the US

a golden opportunity of testing reforms undertaken as a result of the Goldwater-Nichols Act, including the trans-service authority granted to the commander of the joint headquarters. The Gulf War brought out the importance of reorganising the armed forces to be future battle-ready. The Chinese PLA also has undergone reorganisation and modernisation in recent years. All this notwithstanding, the authors are also quick to point out that a war conducted under such ideal conditions cannot serve as a model, and that the Gulf War is not a "masterpiece of military skill", but a "sumptuous international fair of high technology weapons".

The book convincingly establishes that, one need not rely on advanced weapons to fight a modern war. The authors say that there are many methods of inducing fear which are more effective, and maintaining weapons at the cutting-edge of technology may even become a cause of national bankruptcy. The reader is hence forced to reflect on whether at least some state-of-the-art weapons displayed by China serve just psychological purposes?

Technological asymmetry between countries notwithstanding, "fighting the fight that fits one's weapons" is not the only option that weaker countries have. A weapon, no matter how advanced, will remain traditional if it is controlled by professional soldiers and employed only in classical battlefields. Hence, the authors propose the concept of *pian zheng shi chao xian zuhe zhan* (modified, combined war that goes beyond limits) which involves combining different 'battlefields' to gain hybrid advantages. The authors describe in great detail, the following 8 principles that this war is based on—omnidirectionality, synchrony, limited objectives, unlimited measures, asymmetry, minimal consumption, multidimensional coordination, and adjustment & control of the entire process. The authors also caution that "going beyond limits" refers to expansion of the 'limited' and does not equate to 'no limits'.

All this notwithstanding, the authors equally emphasise the importance of technology in the armed forces and highlight the importance of reduction in their size; not primarily for bringing down the number of personnel, but for raising the quality of military personnel, increasing the amount of high- and mid-level technology in weaponry, and updating military thought and war-fighting theory. The recent Chinese military modernisation achieved just this. In fact, there is an unmistakable similarity in what is said in the book and China's actions, at least in recent years. The authors' observation that the best way to achieve victory is "to control, not to kill" and China's actions, such as controlling countries by way of loans and fiscally unviable infrastructure projects or the recent example of China politically influencing Nepal by mediating between the warring factions of the

Nepali Communist Party, are all testimony to this. Furthermore, the book refers to ethnic identity, China's long cultural tradition, supposed peaceful ideology and no history of aggression, permanent seat at the United Nations Security Council, geographical factors, etc. as 'strategic resources' which should be employed in addition to 'dominating and exploiting the influence of international organisations'. Indeed, China's influence over the World Health Organization has been in news since the COVID-19 pandemic was reported. Even the relatively old concept of *zhonghua minzu*[4] is noteworthy in this regard.

The authors have studied the US Armed Forces in great detail, especially the doctrines and ideas propounded by top officers such as Sullivan and Schwartzkopf. They have also identified certain weaknesses of the US, the most important one being the view in American military circles that, the military revolution is the revolution in military technology. As per the book, the American thinking stops at the boundary where technology has not reached, and they treat war as a rivalry of military technology. The US pursuit of 'zero casualties' and 'victory at all costs' means that the requirement for technological performance of weaponry outweighs that of military strategy and combat skills, and the American thinking that they are "world's number one" makes them pursue unlimited objectives. While the US may have the most modern military force, the 'generation gap' between the weapons and the military forces is a major issue as it is difficult for high-tech troops to deal with unconventional warfare and low-tech warfare. The authors believe that no matter how powerful a nation is, it will find it difficult to respond to guerrilla tactics. It makes one wonder whether this was the thought-process behind China's 'little blue men', i.e. its maritime militia. The authors lucidly bring out how the US is not prepared for an enemy with a low-level technology, an intermediate-level enemy, or one with equivalent power at the beginning of the next century.

However, the authors also fully acknowledge US supremacy in the field of not just military weapons, but also military thought. For the latter, they quote the example of the use of 'silver iodide' and 'defoliants' during the Vietnam War. One wonders if the Chinese actions of manipulating weather, be it to ensure a rain-free Olympics in 2008 or sending rain-inducing machines across Tibetan Plateau, are all inspired by US actions. On the issue of weapons and tactics, the authors opine that the American concept of "building the weapons to fit the fight" brought in the revolutionary change of tactics preceding weapons.

At a time when China is displaying aggressive Twitter diplomacy and has opened up border and 'proxy-diplomatic' offensives against India, this book

could provide priceless insight into the Chinese thinking. It is also a valuable guide to countries on how to prepare for the 21st century wars. Given its scope and content, it is highly recommended for soldiers and civilians alike.

Kanchana Ramanujam is a former Research Assistant at the Centre for Land Warfare Studies (CLAWS), New Delhi.

Notes

1. Zhang, Ming. "War without rules". Bulletin of the Atomic Scientists, vol. 55, no. 6, 1999, p. 16, accessed June 13, 2020.
2. In mathematics, two quantities are in the golden ratio if their ratio is the same as the ratio of their sum to the larger of the two quantities. This number is approximately equal 1.618.
3. *Zhishenquan* refers to command and superiority in the bio-domain. It especially focuses on bio-crossing technologies.
4. *Zhonghua minzu*, literally meaning Chinese nation, refers to the concept of multi-ethnic statehood based on one Chinese nationality.

China 2020: The next decade for the People's Republic of China

Edited by Kerry Brown
Chandos Publishing, Oxford, UK, 2010
Price: $965; 268 pages
ISBN: 1843346311

The year 2020 will be known for several years to come, not only for the medical calamity that COVID-19 landed the world in, but also for potential shifts in the international system. China is being increasingly viewed as the potential hegemon of the system that will emerge post COVID-19. From the Chinese side as well, the attempts to rise to the moment—be it through military aggression or through softer versions of Chinese diplomacy like medical diplomacy or face-mask diplomacy—are underway in the hopes of filling up the vacuum that could be left behind by the US as it withdraws from multilateralism. Even ten years ago, China was clearly a formidable power in international relations; but changes that have taken place in these ten years and the way China has been able to leverage some of these changes to its advantage is worth a closer look.

Kerry Brown's book, *China 2020: The next decade for the People's Republic of China,* written in 2010 undertook in-depth research to predict what China would look like in 2020. At the very outset, the editor, Kerry Brown, makes it very clear that China needs to be tracked year by year, rather than decade by decade. The essays in the book set out as to where China was exactly, before looking into the future. Divided into eight chapters by eight different authors, the book delves into topics like the Chinese leadership, military, soft power, the Chinese economy, etc. The book attempts to bring perspectives of relatively new writers in 2010 to a wider audience and tries to build on unique backgrounds of the authors, to elaborate each aspect of modern China and its next ten years from a policy perspective. Each chapter is well structured and delves into several related sub-themes. The book makes it very clear that China's collapse, predicted by scholars such as Gordon Chang, have clearly been wrong, just the way the prediction about China metamorphosing into a liberal democracy is. None of the chapters are either pessimistic or optimistic, but looks realistically at what existed in 2010 and what was most likely to happen in 2020.

Writing about the leadership and the party in 2020, Kate Westgarth makes an accurate prediction, as she writes that the role model of the assiduous, clean and self-sacrificing leader will be promoted in the party propaganda and sanctioned by the leadership. She adds that, regardless of which individuals are leading China in 2020, the overarching concern for the party will remain its legitimacy and its ability to manage the complex nexus of domestic issues adequately. Her prediction about the clean and tireless leader has come true as seen in Xi Jinping's campaign against corruption, his "China Dream" and hopes of regaining China's stature as the Middle Kingdom. The overarching concern, beyond foreign policies and economics, remains the domestic for the Party, as we saw China rapidly mobilising resources to ramp-up its public health infrastructure for its own citizens in the current COVID-19 world order.

Brown's predictions about China's international relations, as to how it will have increased assets abroad, the protection of which and their involvement in which, along with large numbers of Chinese citizens working beyond Chinese borders, is true, as we see China's increasing investments abroad in the form of its Belt and Road projects, on which Chinese workers have been working in large numbers. Brown's predictions about how the US and China, as key actors in 2020, will have to deal with sharper potential conflicts, has also come true in the form of the US-China trade war. There is one miscalculation by Brown that China will be a reluctant global power in 2020, as China will have to focus on its own internal issues, because of which it will shy away from issues that do not directly relate to it. While it is true that internal issues still remain the primary focus for China, Xi Jinping's speech at the 19th Party Congress in 2017, when he said that the Chinese growth model should be copied by developing countries, clearly indicates that China wants to assume the role of a leader. It has clearly moved far away from Deng Xiaoping's policy of "hiding one's power and biding one's time".

On the role of foreign capital and the potential of it bringing in foreign values of democracy in China, Peter Wood aptly states that it is not on the agenda of the Chinese Communist Party (CCP) to hand power over to another institution in China, let alone to foreign capital. Using Dai Bingguo's statement at the US-China Strategic Economic Dialogue in June 2009 as a spring board for the chapter on the economy, Wood states that the leadership in China will do everything to protect China's national interests and that economic issues are also always political issues. In 2009, Dai had stated that Chinese core interests are first the maintenance of the basic system, second national security and territorial integrity and third the stable development of the economy.

Regarding the Chinese military aggression that the world currently witnesses in the COVID-19 world, be it in the South China Sea or at the borders with India, Gary Li made an accurate prediction in the chapter on the military, as he stated that it is certain that the world will find itself facing a China that is growing in confidence and becoming even more assertive; for the countries of East and Southeast Asia this will be particularly worrying. In his assessment of the People's Liberation Army, Li states that it is the armed wing of the CCP. Li makes apt analysis of the PLA Navy as well, stating that Chinese forces have a long way to go in terms of long-range deployments as the crew suffers from lack food and fatigue caused by long periods at sea. This is a big reason for the creation of naval ports under the aegis of BRI. Li states that China has not displayed the signs of a revisionist power. However, as witnessed in 2020, China is clearly a revisionist power, attempting to forcibly rewrite the norms of the international system through everything including military might. Li moves beyond just the PLA and the PLAN as he also writes as to how China will use artificial intelligence, cyber warfare and its paramilitary forces in the years to come.

Jonathan Watts in the chapter on **environment**, mentions as to how the strain on the world resources in 2020 will impact China. He details issues of land use, agriculture and food security, clean water and good quality air. As seen in 2020, all of these are issues that the common Chinese finds problematic to access. Elizabeth Corrin in her chapter on **the rule of law**, adeptly describes how Chinese values based on Confucianism, Mohism and Daoism are different from Western interpretations of law. She delves into how the relationship between the individual and the society is the 'springboard' for understanding the 'legal' in China. She also elaborates on the evolution of the profession of lawyers in China, and states as to how till 1976, the legal profession was the target of political attack; and while there is now a greater willingness of lawyers to represent clients against the state, there still is reluctance to accept cases that involves representing clients in cases concerning political rights and freedoms. Human rights are seen by the Chinese states as determined by culture. China imposes a hierarchy of importance on fundamental rights, and in this hierarchy economic rights take precedence over civil and political rights. This is clearly seen in the development that is underway in Xinjiang and Tibet, where personal freedoms are curtailed, but economic development is given precedence in the hopes of 'stabilising' the western regions.

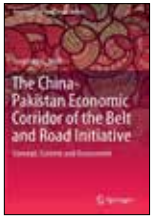
Victoria Tuke's chapter on **China's soft power** comes very close to offering explanations into China's 'wolf-warrior diplomacy', as she states that China's

diplomatic drive for 'reputational capital' has not historically been an overwhelming triumph. This is exactly what prompted Hua Chunying to lament the lack of a fighting spirit in Chinese diplomats last year, after which Chinese diplomats across the world are resorting to vitriolic comments and statements about countries across the globe, in attempts to put the Chinese narrative out there. Tuke's statement on the vitality of credibility in public diplomacy is important, as she states that China will continue to battle for credible public diplomacy till its soft power is channeled more through individuals, universities and businessmen and not alone through this government.

However, in the current COVID-19 world order, in countries ranging from Australia to India, public opinion of Chinese individuals and businesses is negative. Confucius centres across the globe are getting shut by host governments, and the 'Huawei controversy' has only made countries and citizens more suspicious of any form of Chinese soft power. In the COVID-19 world order, Tuke's statement about how public diplomacy is reactive, as seen in the case of the SARS and Avian Flu outbreaks, becomes pertinent. She states that, Chinese public diplomacy as seen in these cases is defensive, secretive, potentially dishonest, overcautious and slow in responding to crisis that has been reported. This remains entirely true for the spread of the COVID-19 which took the shape of a global pandemic, thanks to China's information cover-up.

On the whole, the book is an excellent read, which flows easily. It provides in-depth information and is objective in its approach. While it could not give out specificities of what China will be in 2020, its predictions are mostly closer to the reality in 2020. One drawback of the book is that it could have used more Chinese sources, and while it does mention countries like India, Japan, Australia and the ASEAN countries in various contexts in various chapters, a full-fledged chapter would have been beneficial. The book provides a comprehensive account of China in 2010, and where it is headed in a decade's time. It is a must read for students and practitioners of Chinese Studies or anyone attempting an understanding of the world order that will emerge in the post COVID-19 era.

Dr. **Sriparna Pathak** is an Assistant Professor and Assistant Academic Dean at Jindal School of International Affairs, O.P. Jindal Global University.



The China-Pakistan Economic Corridor of the Belt and Road Initiative: Concept, Context and Initiative

Siegfried O. Wolf

Springer Nature Switzerland AG, 2020

Price: $110; ISBN: 978-3-030-16197-2

The Belt and Road Initiative (BRI) is one of China's most ambitious projects with no parallel in history, as far as investment and scale is concerned. It intends to connect Asia with Europe, the Middle East and Africa and envisions economic growth and sustainable development. The China-Pakistan Economic Corridor (CPEC) is a flagship project under the BRI, and the biggest economic endeavour with a budget of US$ 64 billion that aims to connect the restive Chinese region of Xinjiang Province to Gwadar Port on the Arabian Sea, through a land route via Pakistan. In the past, a lot has been written on the CPEC, however this book has attempted a comprehensive and in-depth study focusing on an overall vision of the CPEC project. It gauges the anticipated economic, political and geostrategic impacts on the region, and discusses whether the CPEC will serve as a pioneer project for future regional cooperation between various regions of Pakistan that are perpetually in conflict with one another.

The author, Dr. Siegfried O. Wolf, has divided the book into ten chapters. In the first chapter he highlights the existing connectivity gaps in South Asia, and of economic corridors—a phenomenon that has gained prominence in recent times—as an instrument to promote development and sustainable growth, and on which China has based the BRI/CPEC. It also discusses Sino-Pakistan relationship, which has been an 'all-weather friendship' and both countries have supported each other through thick and thin on various platforms. Beijing has included the CPEC in its 13th Five Year plan, which reflects the importance accorded to it and to their friendship with Pakistan. Notwithstanding the official stance, the Chinese view Pakistan as an unequal partner as total trade with Pakistan, though heavily skewed in China's favour, is very limited. However, they believe that the CPEC might as well become a catalyst in changing this. In Pakistan, China also has a mixed credibility i.e. as an investor and a donor. The author supports his argument with the data of one decade, which shows that Beijing has delivered only 6 per cent of Foreign Aid and Government Sponsored Investment Activities (FAGIA) that was promised to Pakistan. In the same period, it delivered approximately 65 per cent of FAGIA that

was promised to Sri Lanka. Therefore, the CPEC is still viewed with much skepticism by the general public in Pakistan, since most of the project details and agreements have not been made available to them.

In the next chapter, he explains the concept of Economic Corridors (EC) and their importance. There are various stages involved in the development of EC. These corridors are often seen as the drivers for inclusive growth, hence it is essential that these corridors are further designed to create domestic, regional and global corridors and supply chain. It is envisioned that the establishment of the EC will be accompanied by crucial economic as well as social and political improvements. The author also highlights the importance of key indicators like growth zone, Special Economic Zone (SEZ), internal and external connectivity, etc.

Wolf also traces the role of the Pakistani military in the CPEC in detail. The military in Pakistan influences both government and business, stretching the concept of a military–industrial link to an extreme. He also explains how the interests of Pakistani military are closely connected to the CPEC. Military Business (MILBUS) by the Pakistan Army in CPEC projects may become a reason of tension between the military and civilian businessmen as the military tends to bend the rules to suit their own convenience and interest, which could be disadvantageous to other private players. The military is seen as an influential power, a 'state within a state' which might intentionally or unintentionally become an impediment in the development and growth of the EC.

The next two chapters outline the involved interests of the main stakeholders in the CPEC and the challenges faced in its implementation process, due to the existing socio-political dynamics in Pakistan, which are likely to hamper the execution of the projects. Therefore, a question arises: Whether CPEC is driven by geostrategic and geopolitical ambitions or is it predominantly an economic agenda? It is very clear that China's interests go much beyond a mere development strategy. By and large Chinese motivations to establish the CPEC are driven by economic, social, political, geostrategic and security interests. Further, the author talks v the 'Chinese Dreams' by fulfilling economic and modernisation goals, and also discusses China's new industrial policy called 'MIC-2025' (Made in China-2025), aimed at transforming China into a hi-tech powerhouse that centres around smart manufacturing. The state-owned enterprises (SOEs), struggling with debt burden, would get a fresh lease of life in the form of new markets for exporting their over-capacity and over-supply. The BRI/CPEC will also enable improved use of foreign exchange reserves, and the investment of this money will not only boost confidence in the Chinese economy but will also prevent financial outflow from China.

Systematic discrimination against the Western Region of China vis-à-vis the Eastern and Southern parts, is a cause of heartburn for the non-Han Chinese and for disturbance in the region. China wants to redress this through the CPEC and also intends to address the 'three evils' (terrorism, separatism and religious fundamentalism) by developing its Western Region. As pointed out earlier, establishment of the CPEC is not purely with an economic aim but also to forge alliances, nation branding, uplifting China's image in the target countries and to create a geostrategic environment with a larger aim to 'shape a new world order'. The establishment of port facilities at Gwadar, Karachi and Djibouti (military base) reflect the clear geostrategic and security ambitions of China. Any assistance that China has been providing to Pakistan, directly or indirectly, has been with a desire to 'Contain India' and to keep it off balance, as also to reduce the Indo-US leverage in the Indo-Pacific region. It is also evident from the facts brought out in the book that the CPEC cannot be seen as an alternative to the Malacca dilemma, keeping in mind huge volumes of the Chinese trade and ships that pass through it. The sea route is much cheaper, faster and safer as compared to the land route, as also interdiction of Chinese shipment/convoys at Gwadar Port, would be much easier than possibly at Malacca strait.

Dr. Wolf analyses the Pakistani motivations from the CPEC as two-folds: first is the economic development, and second, its politico-geostrategic and security dimensions. The CPEC may improve Pakistan's infrastructure and enhance trade, although numerous impediments do exist. The development of Gwadar port has a strategic significance as it will not only ensure close monitoring of activities of other countries in the region but also guarantee security, reduce vulnerability to naval blockade due to its geographic location/presence of the Chinese in the port and offer various offensive options.

The author points out that, the inclusive growth by Pakistan under its 'Vision 2025' is apparently next to impossible to achieve due to its huge informal economic sector which has a tendency of carrying out illegal economic activities. Pakistan, for years, has been thriving on foreign aid and loans which are presently under the scanner due to its policy of continued support to terrorist activities in its neighbourhood, which is emboldened by China's unconditional support to it. The author further points out that Pakistan's relations with all its neighbours are either hostile or at least troubled, which it needs to examine to be able to develop and progress.

In the next segment the author identifies several challenges that the CPEC is facing in its implementation. He elaborates on Pakistan's territorial disputes

with neighbouring countries, the constitutional and legal dimensions of Gilgit-Baltistan and issues pertaining to PoK through which the CPEC is planned. Some other challenges to a stable security situation are the Balochistan factor, the Uyghur issue, terrorism and international Jihadism. The ongoing insurgency in Balochistan is one of the main security challenges to the CPEC. The Balochis are a deprived community and are being relegated to a minority due to the migration policy of the Pakistan government. They have been feeling militarily oppressed, economically exploited, and socially and politically sidelined. Gwadar alone is expected to have one million newcomers. On the Chinese side, the Uyghur issue poses a major security challenge to the CPEC.

Wolf goes on to discuss the impact of the CPEC on EU-Pakistan economic and trade relations. He traces Pakistan's long association with the EU, dating back to the 1960s. Since 2001, Pakistan has been of crucial interest for many European countries mainly because of the increasing threat of Islamic radicalism and the war on terror. The geostrategic importance of Pakistan increased dramatically after 9/11, due to the involvement of the European forces in Afghanistan. Although the EU has been disappointed with Pakistan's existing policy of support to Islamist militants and to various terrorist organisations, however, it has, decided to continue its engagement with Pakistan and keep it in 'GSP+' (generalised scheme of preference plus) category. The EU considers that Pakistan's isolation would, on the one hand, draw it closer to various international militant/Jihadi organisations, but on the other, it would get into the grip of China with no other options left with it. Another reason why the EU supports Pakistan is that it believes, a stable Pakistan would be good for peace in Afghanistan and the region as a whole.

In this part, the author highlights the feasibility of extending the CPEC to Afghanistan. He deliberates upon China's new interest in Afghanistan that covers a full spectrum of political, strategic, geographical, economical and security-related aspects. The enlargement of the CPEC to Afghanistan has, in theory, the potential to boost China's role in the region as facilitator of the cooperation and provider of security and economic growth. However, considering the realities on the ground, extension of the CPEC is likely to threaten and worsen the situation rather than improve the condition of the Afghan people.

Dr. Wolf gives an insight into development versus democracy and civil-military relations in Pakistan. He has clearly highlighted it with examples—the high handedness of the military and their keen interest in the CPEC. He has pointed out in the book that, military courts are being used to silence critics of

the CPEC which shows their interest and the level of involvement in business. Finally, the author in his last chapter shares his concluding words on CPEC, its future and how it may be a complete failure but would still serve the geopolitical, strategic and security-related interests of China. This would enable enhanced geostrategic cooperation between China and Pakistan in the future, leading to joint military drills, provision of extensive military assistance, delivery of complex weapon systems, and use of Gwadar port by the Chinese Navy to achieve China's larger geostrategic objective. Keeping in mind the implications of the CPEC in general and Gwadar port in particular, India must prepare its counter strategy to foil any Chinese or/and Pakistani ploy.

This excellent publication deserves praise for its comprehensive insight. However, Wolf could have shared more on India's objections to the project and the problematic transport connection across the China–Pakistan border. These issues, though covered, get very limited space. There could have been more focus on the geopolitics and geo-economics of the project in the early part of the book instead of focusing so heavily on the 'economic corridor' concept. The incisiveness of the final chapter appears to be in marked contrast to the lack of clear framing in the early chapters. The author has made some statements on the status of Gilgit-Baltistan and on the image of China in Pakistan which are contradictory; there have been repeated mentions of the involvement of Pakistan's military in its internal affairs in different sections of the book. A point of objection from the Indian perspective is that the author has mentioned Pakistan-Occupied Kashmir (POK) as *Azad Jammu and Kashmir* (AJK) in the book. On the whole, the book presents a deep and analytical insight regarding the situation on the ground, from the author's extensive fieldwork in Pakistan. Overall, Dr. Wolf's book is an essential source for observers of China-Pakistan relations, think-tanks and students studying the BRI/CPEC.

Colonel **PK Mehta** is a Senior Fellow at the Centre for Land Warfare Studies (CLAWS), New Delhi.

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RPSO Complex, Parade Road, Delhi
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