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AN SP GUIDE



PUBLICATION

193RD GUNNERS
DAY SPECIAL

Land Forces

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ROUNDUP

THE ONLY MAGAZINE IN ASIA-PACIFIC DEDICATED TO LAND FORCES

IN THIS ISSUE

PAGE 3
India's China Policy –
Statement of Defence Minister in Parliament
SP's Correspondent

PAGE 4
Sarvatra Izat-o-Iqbal
(Everywhere with Honour and Glory)



Regiment of Artillery has won many awards since Independence which include seven Mahavir Chakras and 92 Vir Chakras, forty honour titles, amongst others, which speaks highly of their combat capability
Lt General Naresh Chand (Retd)

PAGE 5
Aatmanirbhar Reset 2.0
Prime Minister Narendra Modi has given a clarion call to use these trying times to become Aatmanirbhar (self-reliant). Defence Manufacturing in India has huge potential and can bring a transformative change, but is the industry ready to rise up to challenges.
Lt General R.K. Jagga (Retd)

PAGE 6
Artillery Capability of OFB
No battle or war was fought by the armies of East India Company, the British Empire or independent India where the arms, ammunition and equipment supplied by the Ordnance Factories did not play a crucial role. Now, OFB is leading the clarion call of Prime Minister Modi for "Atmanirbhar India" by indigenous efforts to 'Make in India'.
Gagan Chaturvedi

PAGE 7
Fresh Chinese Moves in Ladakh
The number of PLA battalions deployed in Ladakh has gone up from 35 in August to 50 in September. Tensions are high as opposing troops are eyeball to eyeball in certain locations and there have been incidents of shots being fired in the air.
Lt General P.C. Katoch (Retd)

APPOINTMENTS



Lt General A.S. Bhinder has taken over as Deputy Chief of the Army Staff (IS&T) from September 1, 2020.



C. S. Vishwakarma has taken over charge as the Director General of Ordnance Factories (DGOF) and Chairman of the Ordnance Factory Board (OFB) from September 1, 2020. Before taking over as the DGOF & Chairman, he was the Additional DGOF and Member of the Armoured Vehicles Group.

>> LEAD STORY

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PHOTOGRAPH: Indian Army



The overwhelming fire support of Artillery guns contributed hugely in achieving victory during the Kargil war in 1999

Topekhana and Random Thoughts

Inscription on French canons – Ultime ratio regum (The final arguments of Kings)



■ GENERAL J.J. SINGH (RETD)

INDIA IS SITUATED IN a turbulent and unstable region with failing or unstable states, declining regional powers, and states that have facilitated nuclear proliferation. The region has emerged as the epicentre of global terrorism and has the maximum number of countries possessing weapons of mass destruction, with the increasing risk of non-state actors laying their hands on such deadly weapons. Over and above these, we have unresolved boundary issues with China and Pakistan. There are not many countries in the world that have to face the full spectrum of threats as India does, from low intensity to an all-out conventional war in diverse terrain while keeping in mind the nuclear overhang. To deal with

them we would require an array of defensive and offensive capabilities, so as to deter or blunt the aggressive designs of any adversary and thus guarantee our territorial integrity. Modernisation and upgradation of the weapons and equipment systems and intelligence and surveillance capabilities, and an effective command and control set-up is the mantra for our armed forces. As has been our experience, capability building takes time, whereas intentions can change rapidly. It would be axiomatic to point out that this calls for a well-led, -trained and -equipped military with an updated and compatible joint doctrine to face the challenges of the battlefield of tomorrow, which will be digitised and net-centric.



Regiment of Artillery celebrated their 193rd 'Gunners Day' on September 28 thus it was appropriate to dedicate this issue of the magazine to the 'Glory and Valour' of Gunners. The lead article appropriately is by General J.J. Singh, former Army Chief, who gives his experience with the Gunners. He talks about 'Operation VIJAY' and the contribution of artillery regiments in crushing the enemy in various operations. During the Kargil war, in which he was actively involved, General Singh details how most of the infantry attacks were launched with overwhelming fire support of over one hundred artillery guns, mortars and Multi Barrel Rocket Launchers. A large percentage of Pakistani casualties occurred due to the artillery shelling leading to a large number of battle honours, awards for gallantry and decorations were bestowed

upon the Gunners for their conspicuous bravery and exemplary courage in battle.

In another article on Regiment of Artillery, dedicated to the 'Gunners Day', Lt General Naresh Chand (Retd) gives out an overview of the Regiment, with brief history, role, inventory, modernisation and performance in battle. Regiment of Artillery has won many awards since Independence which include seven Mahavir Chakras and 92 Vir Chakras, forty honour titles, amongst others, which speaks highly of their combat capability.

Excerpts of Raksha Mantri Rajnath Singh's statement in the Parliament on China's infringement in Ladakh, is included in this issue. This statement enunciated India's stand on the LAC and its policy towards China in resolving the current dispute. He stressed that, "while no one should doubt

our determination to safeguard our borders, India believes that mutual respect and mutual sensitivity are the basis for peaceful relations with neighbours".

In an update on the critical situation in Ladakh, Lt General Katoch (Retd) states that the number of PLA battalions deployed in Ladakh has gone up from 35 in August to 50 in September. Tensions are high as opposing troops are eyeball to eyeball in certain locations and there have been incidents of shots being fired in the air and draws some far reaching conclusions.

In an article in this issue, Lt General Jagga (Retd) talks about the modified narrative of acquisition of defence hardware from 'Indigenous', to 'Make In India' and now 'Aatmanirbhar' and the hurdles India will face in pursuing this approach. He states that

the Defence Ministry has always been empowered but the turf battles are what thwarts all attempts at building the domestic defence manufacturing industry. The trust amongst Defence PSU's, Ordnance factories and DRDO is in the grey zone with the private sector right in their grievance of not getting a level playing field.

Wishing the Gunners a very happy anniversary and may they prosper and bring greater glory to India!

Happy Reading!



JAYANT BARANWAL
Publisher & Editor-in-Chief

It came as a pleasant surprise when I was requested to write a piece for the forthcoming Artillery Day. Being no expert in gunnery, I thought that I would write about my impressions of the *Topekhanas* or more colloquially *The God of War* and other random thoughts. Historically, strategy and tactics have depended upon technological developments in armaments and weapon systems. Infantry and cavalry were long established components of the armies since ages. Elephants carrying the Standards and Colours being used by the kings as the symbol of their power were a later development. Babur introduced the *Topekhanas* influenced by the use of cannons by the Ottoman Empire in 1514. This was a game changer in warfare at that time and Babur's artillery greatly helped him in establishing the Mughal Empire. The sound and fury of the cannons caused panic amongst the elephants of the Indian rajas and generals and fear in the minds of their infantry and cavalry, and many a battle was lost on that account.

Maharaja Ranjit Singh is credited with the creation of a modern army trained on European lines by officers of Napoleon's army, who fled after the defeat at Waterloo and sought employment in the Sikh Empire. Amongst them were General Court and Colonel Gardner who organised and trained the *Topekhanas-i-Khas* commanded by Mian Ghaus Khan. In the artillery of the Sikh army were elephant, camel, horse and bullock drawn guns. These units were called *Topekhanas* Filli, Shutri, Aspi and Gawai respectively. This well trained artillery was more than a match for that of East India Company's army. In the south of India it was Tipu Sultan who created havoc with his rocket force. Ever since the Mughal days, and particularly after the rebellion of 1857, it had become a practice where a culprit who was sentenced to death being blown to smithereens in full public view by a close range cannon shot (*tope se uda dena*). Indeed a ghastly execution with a telling effect!

Fast forward to the modern battlefield, an account of what artillery can achieve; and this is not science fiction but a real event as narrated by Captain Harrison Morgan US Army, of the effect of massed Russian rocket artillery fire on a Ukrainian mechanised battalion. At the break of dawn, seeing the drones overhead, the Ukrainian sentry sounded the alarm and everyone dived for cover, but it was too late!

"Within moments dozens of rockets came streaming down from the heavens raining a hailstorm of hell on the battalion's position. Cluster munitions burst, steel shredding



PHOTOGRAPH: PRO Defence Nagpur

The boom of the artillery guns plays on the minds of the enemy

man and machine below. Thermobaric warheads erupted with terrible concussion. In just three minutes, the entire battalion lay crushed in a smouldering fire, destroyed by a concentrated barrage of rockets and missiles fired thirty kilometres away" (mwi.usma.edn, September 25, 2018).

It is hoped that in the near or mid-term future our gunners will also be as capable. This also brings home the point that we could expect and should be prepared for such a bombardment, albeit on a smaller scale, from the rocket force of the Chinese PLA in a future conflict.

The most intense and intimate involvement with our artillery in my career was during the Kargil war in the summer of 1999. As the Additional Director General in Military Operations Directorate (ADGMO) at Army Headquarters, I was deeply involved in the evolution and execution of the overall strategy at the macro-level to evict the Pakistani army from all areas clandestinely occupied by them on our side of the line of control (LoC) in the Kargil war. Incidentally, it was us who decided the name for the war 'Operation VIJAY', and indeed a resound-

The modernisation of our Army, the artillery in particular, has been one of the foremost concerns of every Chief of the Army Staff (COAS)

ing VICTORY we achieved. We ordered the mobilisation of additional resources in terms of infantry formations, artillery regiments including the Bofors medium guns from our strike corps, Multi Barrel Rocket Launchers (MBRL) batteries, heavy mortars, air defence, army aviation, engineers, and logistics and medical units so that we could crush the Pakistani army by our fierce response. Most important was procurement and provision of ammunition for our Bofors 155mm guns and missiles and essential equipment ex-import on emergent basis.

At this stage it would be appropriate to narrate excerpts from the chapter 'Kargil-The Pakistani Misadventure' of my book 'A Soldiers General'. "The effective use of artillery and the air force gave us an unbeatable edge over the Pakistanis. Most of the infantry attacks were launched with overwhelming fire support of over one hundred guns, mortars and MBRLs. Thousands of shells, bombs and rockets carrying many tonnes of TNT breaking into warped shrapnels of metal, wreaked havoc on the enemy. The boom of the guns and sounds of the blasts on the targets, reverberating in the mountains played on the minds of the soldiers of both sides-positive and morale boosting in our case, and demoralising for the Pakistani soldiers. It is estimated that a large percentage of Pakistani casualties occurred due to the artillery shelling". The gunners of 8 Mountain Artillery brigade and other regiments innovated and perfected their skills of direct shooting. The fires of the Bofors 155mm guns in particular proved to be extremely accurate and hugely contributed to the pulverising of the enemy.

A large number of battle honours, awards for gallantry and decorations were bestowed upon the artillery and army aviation units and

officers, JCOs and soldiers for their conspicuous bravery and exemplary courage in battle. Besides decorations of many fearless gunner warriors that comprised four Vir Chakras and three Yudh Sewa Medals for displaying indomitable courage, 108 and 197 Medium Regiments and 141 Field Regiment and two Recce and Observation Squadrons of Army Aviation were honoured with Battle and Theatre honours and Unit Citations. 158, 286 Medium Regiments, 41, 315 Field Regiments, 1889 Light Regiment and 2122 Rocket Battery were decorated with Battle Honours. The adage that artillery firepower plays a vital part in achieving victory in war was established beyond doubt and gratefully acknowledged both by the commanders at all levels and the frontline soldiers of the attacking infantry. The capture of strongly held positions at extremely high altitudes was greatly facilitated by intense and accurate close support provided by our gunners that greatly helped in breaking their will to fight. Casualties of the attacking soldiers were considerably reduced due to the suppression of ground and artillery fire by effective bombardment of our artillery. It is estimated that over two lakh shells, bombs and rockets were fired during the Kargil War. The concept of 100 gun fire support for every objective was amply validated too.

The modernisation of our Army, the artillery in particular, has been one of the foremost concerns of every Chief of the Army Staff (COAS). Ever since the acquisition of the 155mm Bofors gun in mid 1980s, there had been no induction of medium artillery guns for three decades due to various reasons including the unsavoury controversy related to the Bofors guns. Although in our perspective plans for modernisation of artillery we had envisaged procurement of additional medium guns including the self propelled variety, either indigenously manufactured or imported, it had been established beyond doubt that the requirement of new guns was critical and urgent.

Having served many years in various areas along our northern borders such as Arunachal Pradesh, Sikkim, Joshimath sector and Kashmir, I had seen and experienced the appalling conditions and inadequacy of our road infrastructure there. We had to trek for four days (125 kms) to reach Walong, our area of operations, when I was commanding a battalion in 1981. Since the situation had not improved much in two and a half decades, this state of affairs was not acceptable to me when I became the Army Chief in 2005. What if a Depsang, Pangong Tso or Galwan-like situation was created by the clever, untrustworthy and deceitful Dragon

India's China Policy – Statement of Defence Minister in Parliament

■ SP'S CORRESPONDENT

RISE TODAY TO BRIEF the esteemed Members of this august House about the developments on the Borders of Ladakh over the past few months.

As the House is aware, India and China are yet to resolve their boundary question. The Chinese position is that the boundary between the two countries has not been formally delimited, that there exists a traditional customary line formed by the extent of jurisdiction that they claim was exercised historically by each side, and that the two sides have different interpretations of the position of the traditional customary line.

China continues to be in illegal occupation of approximately 38,000 sq kms in the Union Territory of Ladakh. In addition, under the so-called Sino-Pakistan 'Boundary Agreement' of 1963, Pakistan illegally ceded 5,180 sq kms of Indian territory in Pakistan Occupied Kashmir to China. China also claims approximately 90,000 sq kms of Indian territory in the Eastern Sector of the India-China boundary in Arunachal Pradesh.

I would like to mention here that as yet there is no commonly delineated Line of Actual Control (LAC) in the border areas between India and China and there is no common perception of the entire LAC. Therefore, in order to ensure peace and tranquility in the border areas, especially along the Line of Actual Control (LAC), the two countries have concluded a number of agreements and protocols. Under these agreements, the two sides have agreed to maintain peace and tranquility along the LAC without any effect to their respective positions on the alignment of the LAC as well as on the boundary question.

A key element of both the 1993 and the 1996 Agreements is that the two sides will keep their military forces in the areas along the Line of Actual Control to a minimum level.

Since April 2020, we had noticed a build-up of troops and armaments by the Chinese side in the border areas adjacent to Eastern Ladakh. In early May, the Chinese side had taken action to hinder the normal, traditional patrolling pattern of our troops. In mid-May the Chinese side made several attempts to transgress the LAC in other parts of the Western Sector. This included Kongka La, Gogra and North Bank of Pangong Lake.

We made it clear to the Chinese side both through diplomatic and military channels that China was, by such actions, attempting



PHOTOGRAPH: Rajya Sabha TV

to unilaterally alter the status quo. It was categorically conveyed that this was unacceptable. The Senior Commanders of the two sides in a meeting on June 6, 2020 agreed on a process of disengagement that involved reciprocal actions. Both sides also agreed to respect and abide by the LAC and not undertake any activity to alter the status quo. However in violation of this the Chinese side created a violent face off on June 15th at Galwan. Our brave soldiers laid down their lives and also inflicted costs including casualties on the Chinese side.

While no one should doubt our determination to safeguard our borders, India believes that mutual respect and mutual sensitivity are the basis for peaceful relations with neighbours. As we want to resolve the current situation through dialogue, we have maintained diplomatic and military engagement with the Chinese side. In these discussions, we have maintained the three key principles that, determine our approach: (i) both sides should strictly respect and observe the LAC; (ii) neither side should attempt to alter the status quo unilaterally; and (iii) all agreements and understandings between the two sides much be fully abided by in their entirety.

As of now, the Chinese side has mobilised a large number of troops and armaments along the LAC as well as in the depth areas. There are several friction areas in Eastern Ladakh including Gogra, Kongka La and North and South Banks of the Pangong Lake. In response to China's actions, our armed forces have also made appropriate counter deployments in these areas to ensure that India's borders are fully protected. This is still an ongoing situation and obviously involves sensitive operational issues. This rapid deploy-

ment by our armed forces including ITBP has taken place in a challenging time of COVID-19. It has also been made possible by the high importance that the Government has placed for developing border infrastructure in the last few years. The House is aware that over the last many decades, China had undertaken significant infrastructure construction activity that enhanced their deployment capabilities in the border areas. However, in response, our Government too has stepped up the budget for border infrastructure development to about double the previous levels. As a result, more roads and bridges have been completed in the border areas. This has not only provided much needed connectivity to the local population, but has also provided better logistical support for our armed forces, enabling them to be more alert in the border areas and respond more effectively where required. In the coming years too, the Government remains committed to this objective. We will not back down from taking any big and tough step in the interest of our country.

I would like to emphasise, that India remains committed to resolving the current issues in our border areas through peaceful dialogue and consultations. It was in pursuit of this objective that I met my Chinese counterpart on September 4, 2020 in Moscow and had a detailed discussion regarding the current situation with him. I conveyed in clear terms our concerns related to the actions of the Chinese side, including amassing of large number of troops, their aggressive behaviour and attempts to unilaterally alter the status quo that were in violation of the bilateral agreements. I also made it clear that even as we wanted to peacefully resolve

the issue and would like the Chinese side to work with us, there should also be no doubt about our determination to protect India's sovereignty and territorial integrity. My colleague, S. Jaishankar, the External Affairs Minister, has thereafter met the Chinese Foreign Minister in Moscow on September 10, 2020. The two have reached an agreement, which, if implemented sincerely and faithfully by the Chinese side, could lead to complete disengagement and restoration of peace and tranquility in the border areas.

In the past too we have had situations of prolonged stand-offs in our border areas with China which have been resolved peacefully. Even though the situation this year is very different both in terms of scale of troops involved and the number of friction points, we do remain committed to the peaceful resolution of the current situation. I want to assure 130 crore people of our country that we will not let the country down. This is our firm resolve towards our nation.

I want to assure the people of our country that the morale and motivation of our Armed Forces is very high, and our soldiers are committed to overcome any challenge that may come in their way. This time also, our soldiers have chosen patience and courage over aggression. Our soldiers are a living symbol of restraint, bravery and valor. Special warm clothes, special tent for their living and adequate arrangement of all their weapons and ammunition have been made for them suitable to the extreme weather conditions. The spirits of our soldiers are high. They are capable of serving at forbidding altitudes with scarce oxygen and in extremely cold temperatures, something that they have effortlessly done over the last many years on Siachen, and Kargil.

It is true that we are facing a challenge in Ladakh, but I am confident that our country and our brave soldiers will be able to surmount every challenge. I urge this House of the Parliament to unanimously honour the courage and valour of our Armed Forces. A message of unity and complete confidence of our brave soldiers will resonate not only across the country but also across the world and shall infuse a new confidence, new energy and unlimited enthusiasm in our forces. ■

Jai Hind!!

Note: These are excerpts from the statement made by the Raksha Mantri to Lok Sabha on September 15 and to Rajya Sabha on September 17, 2020

in areas where we did not have roads? How would we provide artillery fire support to the infantry? These questions had no answer. Although plans for construction of strategic roads along the northern borders were under execution, it was clear to me that they would take two or more decades to complete their tasks. And even after that, why would the Chinese not choose an area where we do not have a road. Mulling over this vulnerability over the years it struck me that we must at least have the capability of some medium range ultra light howitzers (ULH) which could be carried under-slung by heavy lift

helicopters for employment basically in the mountains where no roads existed. But it had to be a package deal of acquiring both the guns and the heavy lift helicopters.

Hence after due analysis at Army HQ, we sent this proposal of procuring six regiments worth of ULH along with appropriate heli-lift capabilities for consideration by both Northern and Eastern Commands. To my utter surprise both of them 'negated' our proposal. One of these commands had a gunner as the GOC-in-C! We had to convince them and over-rule their views and push the case to the Ministry of Defence (MoD). Although

the air force had given higher priority for acquisition of fighter aircraft and having such helicopters was not on their drawing board, I was happy to see the Air Chief going along with our views. We were able to convince the Defence Minister of the necessity of these guns and heavy lift helicopters, and the proposal was approved in the next defence acquisition committee meeting in 2006. But to my dismay, the file moved at a snail's pace despite our constant prodding and pushing. Finally the pace picked up and the acquisition of this vitally important weapon system fructified in 2017 because of the present

national leadership's emphasis on making our armed forces more potent and an effective element of deterrence. Today both the Army and the Air Force proudly display the M777 ULH and the double-rotor Boeing helicopters, and my chest swells! With this capability we have entered the top league of modern armies. I hope the Director General of Artillery keeps up his promise of inviting me to witness the firing of these howitzers on the ranges of Devlali or in Rajasthan. ■

The Author is former Chief of the Army Staff, Indian Army.

Sarvatra Izat-o-Iqbal (Everywhere with Honour and Glory)

Regiment of Artillery has won many awards since Independence which include seven Mahavir Chakras and 92 Vir Chakras, forty honour titles, amongst others, which speaks highly of their combat capability

■ LT GENERAL NARESH CHAND (RETD)

Evolution of Regiment of Artillery

The East India Company raised the first regular company of Artillery in 1748, with a small percentage of Indian Gunners. Subsequently Bombay Artillery was raised on September 28, 1827 and was renamed 5 Bombay Mountain Battery. **September 28 is thus celebrated as the 'Gunners Day'.**

Post Independence Operations

Pakistan. During the Jammu and Kashmir operations of 1947-48, two artillery units were employed in infantry role until the arrival of four 3.7 inch howitzers. The artillery units then helped in driving out the infiltrators, successfully defended Srinagar airfield and subsequently routed out Pakistani tribesmen and recaptured key towns.

China. During the China's attack in October 1962, 7 (Bengal) Mountain Battery provided effective fire support in general area of Tawang and Bum La Pass where defences of 1 SIKH were attacked. Subsequently 116 Mortar Battery, 34 Heavy Mortar Battery, 5 and 6 Field Regiment, and 22 Mountain Regiment provided covering fire to the infantry units of 4 Mountain Division to enable them to extricate themselves safely. Similar supports were provided by guns of 17 Para Field Regiment and 71 Heavy Mortar Battery in Walong. In Ladakh Sector 13 Field Regiment and 38 Field Battery played significant role in defending heights around Chushul. In a way history is being repeated now in Chushul, Rezang La and Spangur Gap.

1965 War with Pakistan. Major restructuring of Artillery took place after 1962. Before the 1965 war artillery was called upon to counter Pakistan's evil designs in the Rann of Kutch where 11 Field Regiment, 17 Para Field Regiment and Air Observation Post aircrafts made the Regiment of Artillery proud. The strategic Haji Pir Pass in Kashmir was captured after heavy fighting with the support of 164 Field Regiment, battery ex 7 Field Regiment, a medium and a mountain battery.

1971 War with Pakistan. During the 1971 Indo-Pakistan War, 49 Para Field Battery took part in para drop with 2 Para Battalion to capture Pongli bridge near Tangail which expedited surrender by Pakistani Army in East Pakistan. 851 Light Battery along with 2 Para were the first to enter Dacca on December 16, 1971. The Regiment of Artillery also played a key role in the Western sector.

Kargil Conflict. In the Kargil operations during 1999, Regiment of Artillery unleashed a blizzard of fire power which overwhelmed the Pakistan Forces by systematically destroying the enemy's defences and ultimately broke his will to fight. As a result the brave gunners contributed immensely in hoisting the Tri-colour on Tiger Hill and multiple other peaks in Kargil.

Role

Offensive Operations. Offensive operations involve attack by own infantry on the defensive positions held by the enemy. During attack, artillery fire can cause attrition, destroy/soften the target, prevent direct fire on attacking troops from the enemy by keeping their heads down, carry out



PHOTOGRAPH: MoD

The K9 Vajra-T 155mm/52 calibre gun by L&T is amongst the latest additions to India's artillery

counter bombardment and prevent enemy reinforcements to come to the aid of their troops. Similar support is provided to mechanised infantry and armour regiments.

Defensive Operations. Defensive positions are normally held by infantry and likely routes/approach of attack are analysed and identified as Defensive Fire (DF) targets whose firing data (ballistic data) is pre-registered and recorded. Opportunity targets can also be easily neutralised.

Likely support in the Future Battlefield. The future battlefield will have short and intense engagements; non-linear battles; increased battlefield transparency and employment of precision and high lethality weapon systems in a hybrid warfare environment. Support by artillery in such a battlefield environment will involve real time surveillance and target acquisition at all stages of battle; synergised employment of all available firepower resources to shape the battlefield entailing employment of mortars, guns and long range systems along with the air force to achieve decisive defeat of the enemy. To carry out this role, the artillery should be equipped with suitable surveillance means, weapon platforms, variety of missiles and ammunitions including precision guided systems with high lethality; and a suitable battlefield management system.

Type of Weapon Systems held by Artillery

The Regiment of Artillery holds a variety of guns, mortars, rocket launchers, missiles, unmanned aerial vehicles and surveillance

For future conflicts, the artillery should be equipped with suitable surveillance means, weapon platforms, variety of missiles and ammunitions including precision guided systems with high lethality

systems to carry out their role. Brief details are:

Guns. Artillery's arsenal consists of a variety of guns of various calibre like the indigenous 105mm Indian Field Gun (IFG) with range of about 17 km, 105mm Light Field Gun which is similar to IFG but lighter in weight thus most suitable for the mountains. They were extensively used in Kargil to provide suppressive fire support to own infantry attacking Pakistan defences. In the heavier calibre there is 130mm M46 with a range of about 27 km, 155mm FH-77B with a range of about 24 to 30 km and upgraded M46 guns to 45 calibre where the range can go up to 39,000m, depending upon the projectile. In the self propelled category there is 130 Catapult which has been indigenously integrated by mounting the ordnance of the M-46 atop a Vijayanta tank chassis.

Mortars. Mortars are ideal for firing in the mountains, on troops in the open. Artillery holds 120mm calibre mortars with a range of about 5 to 9 km.

Rocket artillery. Rocket Artillery has a devastating effect at the target end and India has a formidable and back breaking rocket artillery inventory. The oldest is 122mm BM-21 Grad Multiple Barrel Rocket Launcher with 40 rockets on each launcher and a range between 11 to 20 km. The pride of place is 214mm Pinaka multi-barrel rocket launcher which has been developed indigenously by DRDO. It carries 12 rockets per launcher with a range of 10 to 38 km. The firing sequence is programmable from 4-200sec. The third multi-barrel rocket system is 300mm BM-30 Smerch multiple barrel rocket launcher of Russian origin which carries 12 rockets per launcher with a range of about 20 to 70 km.

Surface to Surface Prithvi-I Missile System. The Surface-to-Surface Missile Prithvi was developed under the Integrated Guided Missile Development Programme (IGMDP) and is reported to have a single-stage liquid fuel dual motor with a range of 150 km with a payload of 1,000 kg. Prithvi is likely to be replaced by Prahaar which is an indigenous tactical ballistic missile with a range of 150 km and designed to fill the gap between long range rocket artillery and the theatre ballistic missile Prithvi.

Agni Missile. The Agni missile is a family of medium to intercontinental range ballistic missiles (MRBM/ICBM) developed by India under the IGMDP and tested in 1989.

Due to the importance of Agni Missile programme, it was delinked from IGMDP and is being developed separately. The MRBM version of Agni is understood to be with the Army. Reported range of the MRBM version varies from 700-3000 km.

BrahMos Cruise Missile. BrahMos is a supersonic cruise missile, development of which started in the 1990s as a joint project between Russia and India. BrahMos is faster, has longer range of 290 km, larger seeker range and much more of kinetic energy as compared to subsonic cruise missile. It has been in service since 2007.

Reconnaissance, Surveillance and Target Acquisition (RSTA)

Surveillance and Target Acquisitions (SATA) units of the Artillery carry out RSTA with ground based and air based sensors. Brief details are:

- **AN/TPQ-37 Firefinder:** AN/TPQ-37 Firefinder is a mobile radar system manufactured by Thales Raytheon Systems (formerly Hughes Aircraft, which was acquired by Raytheon). The system is a long-range version of weapon-locating radar, designed to detect and track incoming artillery and rocket fire to pin point their origin for counter-battery fire.
- **Indigenous Weapon Locating Radar (WLR):** This radar is developed by DRDO and manufactured by Bharat Electronics Limited. The WLR is a mobile artillery locating radar with Phased Array.
- **Israel Aerospace Industries Long Range Observation System (LOROS):** LOROS is a multi-sensor imaging system for long-range day and night observation system.

UAVs. Following are in service:

- **Israel Aerospace Industries' (IAI) Searcher UAV:** Searcher is a multi mission tactical UAV which can carry out the role of surveillance, reconnaissance, target acquisition, artillery adjustment of fire and damage assessment. Searcher has been constantly improved from Mk I to Mk II and Mk III. The Searcher Mk III has multiple operational configurations, like Synthetic Aperture Radar/Ground Moving Target Indicator, SIGINT and EO/IR. It has an endurance of 18 hours and mission radius of 350 km.
- **IAI Heron:** Heron 2 has an operational altitude of 45,000 ft and is capable of missions of more than 36 hours duration. It provides deep-penetration, wide-area, real-time intelligence to theatre commanders and other stake holders.

Modernisation and Capacity Building

The \$8 billion Field Artillery Rationalisation Plan (EARP) was formed in 1999 and was aimed at acquiring between 2700-3600 guns over the next 15 to 20 years (2020-25) to include 155mm/39-Calibre Ultra-Light Howitzers (ULH); 155mm/52-Calibre Wheeled Guns; 155mm/52-Calibre Towed Guns; 155mm/52-Calibre Self-Propelled Tracked and Wheeled Guns; and 155mm/52-Calibre Mounted Gun System (MGS). It was also decided that 155mm will be the standard gun calibre for Indian Artillery. EARP was

Continued on page 7...



Aatmanirbhar Reset 2.0

Prime Minister Narendra Modi has given a clarion call to use these trying times to become Aatmanirbhar (self-reliant). Defence Manufacturing in India has huge potential and can bring a transformative change, but is the industry ready to rise up to challenges.

■ LT GENERAL R.K. JAGGA (RETD)

IN SYNC WITH PRIME Minister's call for 'Aatmanirbhar Bharat' (Self-Reliant India), Defence Minister Rajnath Singh announced a major push to promote the domestic defence industry by placing progressive restrictions on import of 101 weapons and military platforms including light combat helicopters, transport aircraft, conventional submarines, and cruise missiles. The new policy is a continuation of the policy announced in May, 2020 of corporatisation of the Ordnance Factory Board (OFB) and raising of the Foreign Direct Investment (FDI) cap through the automatic route from 49 per cent to 74 per cent. It is hoped by the policy makers that all these policy initiatives shall attract foreign companies with high-end technologies to set up their bases in the country in collaboration with local industries.

Current State

On this new policy initiative, sceptics are of the view that the Defence Ministry did not need this clarion call! The Defence Ministry has always been empowered but the turf battles are what thwarts all the attempts. The trust amongst Defence PSU's, Ordnance factories and DRDO is in the grey zone. No one is willing to let go of the pie and lobbies are at work to derail all steps taken towards major indigenous defence manufacturing capability. The private sector is blame worthy as well, albeit less; and to an extent are right in their grievance of not getting a level playing field.

There is no gain saying that government is serious about its mission of Aatmanirbhar but are the wheels that move the government machinery as enthusiastic? It is because of this scepticism that the new policy has not been received with much earnestness as it is similar to the exercise of 'Make in India,' where self-reliance in defence was a major theme, but none of the major projects got off the ground and most of it remained on paper.

The Challenges

As per reports, the defence minister estimates that as a result of the decision to prune the import list, the domestic defence industry would receive contracts of approximately four lakh crores within the next five to seven years. But where is the certainty of these orders; who will get it - Private Industry or the industries under the Ministry of Defence (OFB / Defence PSUs & DRDO). In last 70 years, the Defence PSUs, Ordnance Factories and DRDO have not been able to make India self-reliant. It is axiomatic that private industry is now expected to take the lead to make India Aatmanirbhar. These defence initiatives are an opportunity for India's industrial leaders to create a strong and profitable defence-industrial base. To become 'Aatmanirbhar', there will be need of huge investments in R&D and other allied activities; no foreign OEM/private player is going to commit large sums of money if there is no certainty of orders, as also a level playing field. And more importantly where is the money? The Armed forces, year after year, have always got less than their demand. The Armed Forces have very little money to modernise and most of it is used for past liabilities. Due to the complex processes of procurement, certain percentage of total allotment from both Capital & Revenue budget gets surrendered too. If the

government is serious about the pronouncements then procurement process must be simplified. The Capital budget should become non lapsable and more allocations will be required.

On the government side, there is a need to focus on simplification of the procurement process and bring in certainty in processes and orders. The new draft DAP, 2020 (Defence Acquisition Procedure), is again a voluminous document running into more than 700 pages. The categories have increased and are likely to cause more confusion. The bureaucrats (are transients and some don't want to understand defence) will use all their wisdom in interpretation of the complicated and puzzling document as per their convenience. No one takes chances! The

nomenclature change from DPP (Defence Procurement Procedure) to DAP is nothing but window dressing; inside the cover the processes are as incomprehensible as ever. A successful management and simplification of the processes is the only way to pave the way for the reset of Aatmanirbhar campaign.

Conclusion

India is one of the most lucrative markets for global defence giants. The country figured among the top three importers of military hardware in the world for the last eight years. If this must change, then it needs a transformational metamorphosis in the mindset of both civilian and military bureaucracy. It will need smart busi-

ness instincts and a sense of purpose to find ways and means to handle the maze of processes/procedures, roadblocks of turf battles & lobbying and yet ensure indigenisation. If this "tremendous initiative" to boost indigenous defence manufacturing turns into reality, it will be a game changer for our country. In comparison to other emerging arms export nations like Turkey, South Korea, and Brazil we are way behind. It will take a major impetus by the government to remove the trammel of bureaucracy to achieve our potential. ■

The author retired in December 2019 as Director General, Mechanised Forces, Indian Army.

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Artillery Capability of OFB

No battle or war was fought by the armies of East India Company, the British Empire or independent India where the arms, ammunition and equipment supplied by the Ordnance Factories did not play a crucial role. Now, OFB is leading the clarion call of Prime Minister Modi for “Atmanirbhar India” by indigenous efforts to ‘Make in India’.

■ GAGAN CHATURVEDI

ARTILLERY PRODUCTION IN THE Ordnance Factories began in the 19th century and has continued till today. From the initial brass and iron guns and iron howitzers to rifled cannon to horse and field artillery in 1905 and the 4.5” howitzer in 1913.

In 1920 the manufacturing of the 3.7” howitzer commenced and was established by 1925. This saw extensive use in the Second World War, the Kashmir operations and in the wars of 1962, 1965 and 1971. Even during the Kargil Operation it was used in the direct firing mode. The 106mm RCL, used so effectively in the 1965 war, and the 75/24 howitzers were also productionised. The indigenisation of the 84mm Rocket Launcher, the manufacture of 105m IFG/LFG, 120mm and 81mm mortars, the L-70 anti aircraft gun and more recently the indigenisation of the A.K. 630 Naval Guns are all significant achievements of the Ordnance Factories. No battle or war was fought by the armies of East India Company, the British Empire or the independent Indian nation where the arms, ammunition and equipment supplied by the Ordnance Factories did not play a crucial role.

By the end of the 20th century, OFB was making spare barrels and other spare parts of the 155mm 39 calibre Bofors Guns imported from A.B Bofors of Sweden.

These guns, which wreaked havoc on the enemy during the Kargil operations were supported and maintained by OFB manufactured spare parts.

It is against this background, experience and technological expertise that the twin successes of “Dhanush” and “Sharang” have to be understood.

The “Dhanush” is a 155mm x 45 calibre modern artillery gun system which is a qualitatively and technologically superior weapon system as compared to the 155mm x 39 calibre Bofors Gun.

Not only does it have a longer and metallurgically re-engineered barrel, a new muzzle brake and a larger chamber volume necessitated by the longer barrel, but mechanical and electronic upgrades make it an entirely different weapon on a number of criteria such as:

- **Range:** A new barrel design and a modified double muzzle brake (MDBMB) have enhanced the range from 27 to 38 Km. The MDBMB limits the stresses on the structure to 155/39 levels.
- **Charge:** The modification of the loading trough and the loading tray enables “Dhanush” to accommodate the larger diameter of the bi-modular charge system (BMCS).
- **Laying:** “Dhanush” has an auto laying system based on the Fire Control Computer system as compared to the manual system of the Bofors Gun.
- **Sighting System:** “Dhanush” has an Advanced Gun Sighting system with a day camera (CCD), a night camera, a laser range finder (LRF) and NFOV and WFOV as compared to the optical day and night sights of the Bofors Gun.
- **Ballistic Calculation:** “Dhanush” has an on board Advanced Tactical Com-



Dhanush during winter trial at Leh



130-155mm Uppgun Sharang



Sharang Uppgun



Dhanush Firing

puter as distinct from Bofors where the ballistic calculations are done at the command post.

- **Gun Recording:** “Dhanush” has an Inertial Navigation System (INS) and a GPS as against the theodolite based system of the Bofors.
- **Gun Positioning:** “Dhanush” has an advanced Gun Alignment and Positioning System (AGAPS) which relies on the INS, GPS, CPU and an odometer.
- **Muzzle Velocity Recording:** “Dhanush” has an on board muzzle velocity recorder (MVR) as distinct from the off-board system of Bofors.
- **Back up Sight:** “Dhanush” has a direct and indirect sighting system based on a day and night sight (RS420) and an indirect sight 104 developed by Ordnance factory, Dehradun in addition to the Electronic Sighting System.

The “Sharang” on the other hand is a cost effective up gunned version of the old 1950s vintage 130mm Soviet guns to 155mm x 45 calibre.

The success of “Sharang” grew out OFB’s success in upgrading the T-55 tank guns in erstwhile Yugoslavia in the 1980-1990. Around the same time the inadequacies of the limited range of 27 km of the 130mm gun came to be increasingly realised. Attempts at upgradation by Soltam Systems of Israel were unsuccessful and when the first guns were supplied in 2002 obturation failures, affecting accuracy, consistency and sustained use began to be observed.

The OFB’s solution of up-gunning was a low cost option to convert it to an all terrain, all weather, accurate gun system capable of

firing the full range of 155mm in – service ammunition. For this the gun was equipped with manual loading and pneumatic ramming features. The sighting system of the gun was retained for reasons of cost effectiveness and simplicity.

The solution finally submitted in the field evaluation trials (FET) proved to be superior to those fielded by two private sector firm who had tied up with OEMs, in the crucial areas of maximum range, direct firing capability, accuracy and consistency. It was a result of this that OFB bagged the order of up-gunning 300 M-46 130mm Guns to 155mm x 45 calibre.

The OFB today is recognised as an OEM of repute with in-house capability of design and mass manufacture of a modern artillery gun system for the 21st century. The main elements of this capability are as under:

- **Design:** OFB, over the years has generated large amounts of proprietary data pertaining to design parameters, manufacturing, testing and validation and performance across the entire life-cycle of a large number of artillery guns across all calibers – 155 x 39, 155 x 45, and 155 x 52.
- This resource is unique and unparalleled and coupled with in-house domain expertise, honed over years, will drive future developments in the field of artillery in the foreseeable future.
- **Metallurgy:** The Ordnance Factories have been manufacturing world class weapons grade steel for artillery, tanks, mortar barrels and trails at the Metal and Steel Factory at Ishapore for more than a century.

In designing the barrel of the “Dhanush” and later the 155 x 52 calibre Mounted Gun System, the methodology of the Bofors 39 calibre – considered a gold standard the world over – had to be reworked. The OFB designers and metallurgists mastered the methodology and a measure of that success is that the OFB exported 155mm x 52 calibre barrels to BAE for testing purposes which have proved to be comparable, if not superior, to barrels manufactured in Europe.

- **Cost Effective Products:** OFB’s expertise of effective design, in-house metallurgy, efficient manufacturing protocols, and high levels of quality control provide an ability to turn out extremely cost competitive products. It is significant that both “Dhanush” and “Sharang” are deployable across terrains and battlefield conditions as terrain specific ordnance is very costly.
- **Capacity:** The end to end capacity for manufacture of Large Calibre Weapons under augmentation by the Large Calibre Weapons (LCW) project will result in the world’s largest capacity for barrels and breech mechanisms produced with high end cutting edge technology.
- **Supply Chain:** OFB has developed supply chain for specialised ESR steel and major sub-assemblies built in-house as well as vendors in the public and private sectors.
- **Proof and Testing:** OFB has the entire infrastructure for carrying out Proof testing and other tests for certifying the quality of modern artillery gun systems. ■

The Author is Deputy Director General, Corporate Communication and HRD, Ordnance Factory Board

PHOTOGRAPHS: OFB



Fresh Chinese Moves in Ladakh

The number of PLA battalions deployed in Ladakh has gone up from 35 in August to 50 in September. Tensions are high as opposing troops are eyeball to eyeball in certain locations and there have been incidents of shots being fired in the air.

■ LT GENERAL P.C. KATOCH (RETD)

THE NEWS UP TO now was that China had inducted two Divisions plus strength (totalling about 40,000) in Eastern Ladakh during April and following its intrusions across the Line of Actual Control (LAC) in May, India also built up their own deployment to about two Divisions strength, facing the Peoples Liberation Army (PLA). Beginning August 29-30, Indian troops occupied the ridgeline south of Pangong Tso Lake, heights in Chushul Sector and the Kailash Range and beyond covering the Spanggur Gap in the nick of time, beating PLA patrols out to occupy some of the dominating features. Tensions are high in areas south of Pangong Tso and there have been incidents of shots being fired in the air as well due to attempted PLA incursion.

But recent inputs indicate that China has brought forward more troops taking total PLA deployment to approximately 52,000, of which about 10,000 troops have been deployed on the southern side of the Pangong Tso. The number of PLA battalions deployed in Ladakh as per one assessment has gone up from 35 in August to 50 in September – addition of 15 battalions. PLA too has occupied additional features south of Pangong Tso and opposing troops are eyeball to eyeball in certain locations. PLA attempts to intrude have been repeatedly foiled by our troops. China obviously wanted to capture whole of Pangong Tso, this being the shortest approach to Leh but faulted in not securing south bank of Pangong Tso using the surprise in May-June while making intrusions in other areas north of Pangong Tso, Gogra-Hot Springs, Galwan and Y-Junction in Depsang. Despite the Defence Ministers of India and China having bilateral discussion in Moscow on the sidelines of the Shanghai Corporation Organization (SCO), followed by a similar bilateral discussion between the two Foreign Ministers at the same venue, China shows no inclina-

tion for easing tensions and withdrawing. The five point agreement reached at Moscow between the two foreign ministers is nothing more than reiteration of earlier agreements that China has repeatedly violated.

PLA is consolidating its deployments, constructing new defences and even laying cables for communications. In some places PLA is resorting to propaganda through loudspeakers harping on poor conditions and food supplies to our troops, blaming Prime Minister Narendra Modi for the state of affairs, at times also playing Punjabi songs. Simultaneously the Chinese media continues with hate narratives, threatening war and saying India can never win against China. China also abducted five youth from Upper Subansiri District of Arunachal Pradesh and returned them only after India raised the issue officially. Togley Singkam, aged 21, one of the abducted youth, told media how he was abducted by PLA troops who had come across the LAC and tortured in captivity for 15 days. India has accused China of violating agreements and carrying out aggressive manoeuvres to change the status quo on ground. However, China puts the onus of disengagement on India. Talks are to continue at military, diplomatic and political levels but there is little hope of any worthwhile progress given the fact that PLA has time and again resorted to hostile actions while talks were ongoing and even when message from China on the hotline was for disengagement.

The present situation is that PLA is not allowing movement of our troops east of Finger 4 north of Pangong Tso while PLA presence continues on upper reaches of Finger 4. South of Pangong Tso, both sides are occupying heights overlooking each other's camps and road communications. China now claims entire Galwan Valley and PLA deployment at Y-Junction in Depsang some 20 km deep do not permit ITBP patrols going to Patrol Point (PP) 10, 11, 11A, 12 and 13. PLA has increased deployments opposite Uttarakhand, Himachal Pradesh, three

areas in Arunachal Pradesh and even opposite Bhutan. Chances of hostilities breaking out are therefore a real possibility. President Xi Jinping's problems at home are increasing and he can resort to limited war to divert attention. India so far has not crossed the LAC and undertaken no quid pro quo even in areas other than Ladakh. Therefore, the initiative remains with the PLA. Logistics problems to maintain troops in Ladakh will increase once the Manali-Leh road closes for winter (mid-November to mid-May if not more) and limited air landings at Leh airfield due to inclement weather. The pressure on air maintenance is going to be colossal to include winter requirements of the civil population which too are huge. The additional troops deployed in the area need defences with overhead protection, which require defence stores.

Our policy makers need to examine overall requirement and augment IAF resources with commercial cargo aircraft as required. Targets for stocking will need to be met well in advance not only catering for inclement weather but also disruption due to possible enemy action in case hostilities break out, both in air and targeting the runway on Leh airfield, which in turn will require pre-positioning of runway repair resources. China has deliberately violated all the confidence-building agreements and the LAC until now on the pretext that the LAC is not delineated on the map. Some opine that delineation of LAC is a possible solution, which is naïve. China respects no LAC or border. If we have not grasped this after China overnight enlarged its illegal claim to entire 90,000 sq km of Arunachal Pradesh, the fault is ours. China has been at war with us since it annexed Tibet and since the 1962 invasion. We are in for a "perpetual haul" rather than calling it a "long haul" as if it would finally end, which it will not till China is balkanized. Until then China is will continue with hostilities albeit there could be tactical pauses to lull us into false hopes. ■

Sarvatra Izzat-o-Iqbal... *Continued from page 4*

an ambitious plan and initially did not make much head way but gradually pace of certain projects picked up as follows:

- **M777 Ultra Light Howitzers of BAE Systems of US:** 145 guns have been contracted with the first 25 guns to be imported and the remaining will be made in collaboration with Mahindra Defence Systems. A total of 7 artillery regiments are planned with the first regiment planned to be raised by end-2020. MoD announced further import of Excalibur ammunition due to tensions with China in Ladakh.
- **Dhanush Guns:** Ordnance Factories Board (OFB) has been tasked to produce a 45-calibre 155mm howitzer based on the Transfer of Technology obtained from Bofors in the 1980s. The Defence Acquisition Council (DAC) had approved a proposal from the OFB to manufacture 144 pieces of 155mm/45-calibre howitzers; phased induction of which has already started and is a feather in the cap of OFB. Additional acquisition will follow after the successful induction of the first tranche.
- **Advanced Towed Artillery Gun System (ATAGS):** ATAGS has been designed by DRDO in partnership with Private Industry and is under development. It

has a range of more than 40km and has 155mm x 52 Cal. In August 2018, DAC approved the procurement of 150 ATAGS with an estimated cost of ₹3,364.78 crore (approx. \$450 million). Apart from OFB, Bharat Forge, Mahindra Defence and Tata Power Strategic Engineering Division are part of the programme.

- **Self Propelled Howitzers (SPH) K9 Vajra-T:** The K9 Vajra-T, an L&T version of Samsung Techwin's K9 Thunder 155mm/52 calibre gun customised for India's Self Propelled Howitzer (SPH) tender, was shortlisted for acquisition after comparative trials. Accordingly L&T got the ₹4,500 crore contract from the MoD during 2017 to supply 100 units of K9 Vajra to the Army under the Centre's 'Make in India' initiative. Prime Minister Narendra Modi inaugurated the Armoured Systems Complex (ASC) developed by Larsen and Toubro (L&T) in Gujarat's Hazira in January 2019 where K9 Vajra are being manufactured.
- **Pinaka:** MoD has signed contracts on September 1, 2020 with Bharat Earth Movers Ltd. (BEML), Tata Power Company Ltd. (TPCL) and Larsen & Toubro (L&T) for supply of six Pinaka Regiments to the Regiment of Artillery at an approxi-

mate cost of ₹2580 crores (approximately \$353 million). The contract includes 114 launchers with Automated Gun Aiming & Positioning System and 45 Command Posts to be procured from TPCL and L&T and 330 Vehicles to be procured from BEML. These six Pinaka Regiments will be operationalised by 2024.

Sarvatra Izzat-o-Iqbal (Everywhere with Honour and Glory)

The capability of the Regiment of Artillery can be judged from its performance during combat. It has performed with dedication and valour in every conflict since Independence and has won many awards which include seven Mahavir Chakras and 92 Vir Chakras, forty honour titles, amongst others, which speaks highly of their combat capability. Apart from the gallantry awards, six eminent gunners were appointed Governors and five as Chief of Army Staff (COAS). Their motto Sarvatra, Izzat-o-Iqbal (Everywhere with Honour and Glory) says it all. ■

The Author is former Director General, Army Air Defence and was a member of Integrated Guided Missile Development Programme.

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