



# ISSUE BRIEF

No. 371

November 2022

## Modern Wars and the Curtain Call of the Main Battle Tank



**Lieutenant General Ghanshyam Singh Katoch, PVSM, AVSM, VSM (Retd)**, has held number of prestigious Command and Staff appointments in his Service. He has commanded an Infantry Battalion on the Line of Control, a Brigade in Counterinsurgency in Kashmir Valley, a Division on the LAC, and a Corps in the Desert Sector of Rajasthan/Gujarat. He retired in March 2016 as the Director General Perspective Planning. Post retirement he worked as the Director of the Centre for Anti-Terrorism Studies at the National Security Guard, Manesar and at the United Service Institution of India as Head, Editorial Team.

*“You never change things by fighting the existing reality. To change something, build a new model that makes the existing model obsolete.”*

—R Buckminster Fuller

### Introduction

Every weapon system has a life — some lasts for many millennia (sword, spear, catapult, chariot, war elephant, horsed cavalry etc.) while some stay active for many hundred years (the knight in armour, rifle, muzzle loaded cannon etc.), and some for under a century (the iron battleship). The war elephant, which can be compared to a tank in terms of its mobility and shock action due to size, emerged in records around 500 BCE and in a ‘recorded manner’ were last used as a military formation around 1526 CE during the 1<sup>st</sup>

Battle of Panipat (wherein gunpowder was also introduced). Cavalry already showed its

### Key Points

- Every weapon system has a life, we cannot ignore this fundamental truth.
- On the modern battlefield, the Drone/ATGM combination is inflicting serious damage to tanks.
- Traditional tank development efforts are focused on the conviction that the best ‘defence against a tank is another tank’. This led to both ‘armour on tanks’ and ‘guns on tanks’ to keep on increasing in weight and size.
- Tanks cannot go on and get bigger and heavier as then they become more vulnerable to another weapon system which is growing rapidly especially the missile firing drone.
- This exchange ratio is adverse to the Main Battle Tank (MBT) as a drone is cheaper besides being more agile than the MBT in most conditions.
- The iron battleship is the most relevant example of technology permitting the construction of a heavily armoured fighting ship, and later the same technology making it obsolete.
- Tanks which have gun/missile firepower, electronic means of stealth, speed, agility and are light enough to be lifted by air, would be the future.



potential to outmanoeuvre elephants but, in this case, it was the advent of cannon which led to elephants running away or amok which ended their use in battle. Horsed cavalry itself, which has been around for many millennia, vanished from the battlefield in 20 years (1919-1929) — quite unprecedented for a weapon system. In this case, it was rendered obsolete by barbed wire and the machinegun, as well as the tank. In some cases, the change happens so fast that, whoever adopts it first, gets the first movers' advantage (as the Germans gained due to the offensive use of tanks). In wake of the Azerbaijan-Armenia War and the current War in Ukraine, usage of tanks have again gained importance. In the view of this writer, going by past precedence, heavy 'armour protected' means of waging wars have had timelines — we cannot ignore this fundamental truth.

### **The Predicted Obsolescence of Tanks**

The death of tanks, as a pre-eminent mode of modern war, has been predicted since the 1973 Yom Kippur war wherein Egyptian Infantry, using the then modern AT- 3 "Sagger" ATGM inflicted heavy losses on Israeli counter attack measures to retake the lost ground on the Bar Lev line. However, subsequent Israeli operations on the Syrian front, especially on the Golan heights, and decimation of Syrian tanks was achieved mainly by Israeli armour. The statement that 'tanks are obsolete' has time and again been called a cliché. At end of the First World War, people wrote that 'tanks would probably never be used again on a battlefield'. However, the Second World War proved them wrong wherein tanks dominated the battlefield. Britain disbanded its armoured units in 1928<sup>1</sup>, though it raised a brigade sized experimental tank force the same year.<sup>2</sup> The War Office, explaining the decision, declared that "tanks are no longer a menace".<sup>3</sup> In 1960, Sir Basil Liddell Hart wrote that "[t]ime after time during the past 40 years the highest defence authorities have announced that the tank is dead or dying. Each time it has risen from the grave to which they had consigned it — and they have been caught napping".<sup>4</sup> Once again, the wars in Nagorno-Karabakh and Ukraine have raised a question mark on the future of the tank.



### ***Nagorno-Karabakh***

The Nagorno-Karabakh War, wherein drones accurately attacked ground targets, especially tanks, highlighted the combat potential of drones. In a similar vein, drones were also used in the Libyan Civil War in 2019.<sup>5</sup> Though touted as the largest drone war of its time, the numbers were nevertheless limited. One side had the Turkish Bayraktar TB2 drones and the other had the similar Chinese Wing Loong II provided by the UAE. The effect of drones, on the fighting in Nagorno-Karabakh, was a replication of events in Syria and Libya, but on a larger scale. It was one sided as the Armenians did not possess similar capability which led to a fair number of Armenian tanks getting destroyed by Bayraktar drones. Israeli supplied Harop suicide drones were also available to the Azeris but it is primarily a Suppression of Enemy Air Defence (SEAD) weapon system. The vivid videos released by the Azeris, made it seem that the 'death knell of the tank' has been sounded. ATGMs too were used by both sides, though apparently the Israeli Spike with the Azeris had greater success. Ultimately, it was the Drone/ATGM combination which caused serious damage to tanks.

### ***Ukraine***

Russia has lost over 853 tanks in its invasion of Ukraine, according to independent battlefield researchers at the open-source intelligence group Oryx.<sup>6</sup> The number increases by every passing day. According to Ukraine, the number is roughly the same— being closer to 700<sup>7</sup> as there are no clear numbers of the numbers of captured/repaired tanks put back into operational use. Whichever of these numbers is correct, they raise the question that 'are tanks obsolete?' Fuelled by Western media and information war videos, the first conclusion appeared to be that 'Ukrainians with anti-tank weapons are wreaking havoc on Russia's tanks'. The actual facts would need to be moderated.

The Javelin is a 26-year-old but continuously upgraded Anti-Tank Guided Missile (ATGM). It has been used extensively in the wars in Iraq and Afghanistan by the USA and its allies. The



reason why its use has drawn greater attention in the Ukraine war is that, the war has seen more Javelin versus tank engagements owing to the fact that the Ukrainians have much lesser tanks and the Russians have much more. Resultantly, there is no dearth of tank targets. Compare this with the wars in Iraq and Afghanistan wherein, according to a 2016 report, Javelin gunners fired “primarily against enemy bunkers, caves, urban structures, mortar positions, snipers, and personnel emplacing IEDs”.<sup>8</sup> A 2009 US Army report highlighted this trend noting that “[o]f the more than 1,200 Javelins fired by British troops, none has been used against armoured targets”.<sup>9</sup>

Artillery ammunition like the ‘vintage but effective laser guided’ Krasnopol has been effectively used by the Russians against Ukrainian armour. By and large what can be gleaned is that, Main Battle Tanks have to be used in offense, but when used by either side in this role, have given exposed targets to drones/ATGMs/artillery and loitering ammunition. The Aug-Sep 2022 Ukrainian counter offensive in the general area of Kherson, wherein the Ukrainians used tanks, was broken up more by the weapons mentioned above than in tank versus tank battle.<sup>10</sup>

## **What Tanks Can Do?**

### ***Seizing and Holding Ground***

In a standard context, though tanks can seize ground, it is only the foot soldier who can dig in and hold it. As the acclaimed military historian TR Fehrenbach wrote “you may fly over a land forever; you may bomb it, atomize it, pulverize it and wipe it clean of life — but if you desire to defend it, protect it and keep it for civilization, you must do this on the ground, the way the Roman legions did, by putting your young men in the mud”.<sup>11</sup> In Ukraine, Russia attempted a lightning invasion, deploying a large number of tanks and mechanised forces with the aim of capturing the major cities quickly. As the battle played out, Russian casualties in men & material mounted and the need for more dismounted infantry increased. President Putin’s directions to recruit 137,000 additional soldiers is unlikely to bridge the gap



in infantry which has become evident as the requirement to hold ground stares Russia in the face.<sup>12</sup> Undoubtedly, the tank is playing an important part in the war. In order for Russia to achieve its territorial objectives in Ukraine, it has to push Ukrainian soldiers out of their positions and control the ground, Ukraine once occupied. Tanks, drones, aircraft and missiles can help to do this but none of them can physically seize and hold ground. The tank can help infantry hold ground but that immobilises a mobile asset. The Battle of Longewala (1971 India-Pakistan War) showed that tanks cannot evict 'dug-in infantry', if that infantry has guaranteed tank/artillery or air support. In the Longewala case, as is well known, it was air support.

### ***Support to Infantry***

In open terrain, armour is the best way to protect infantry as it moves into position to capture and hold ground. Artillery is rightly the 'queen of the battlefield'. If artillery is firing, the only way one can move is under armour. The philosophy on the employment of tanks in the inter war years (1919-1939), favoured heavily 'armoured slower tanks' for supporting infantry and 'faster cruiser tanks with lighter armour' but with a 'heavier gun' for the breakthrough battle. During the Second World War, experience gained from the British and German campaigns in the Western desert in Africa, and German & Soviet experience in the Russian steppes along with the development of more powerful engines and better suspension, enabled cruiser tanks to increase in size, armour and firepower, while retaining their speed and mobility. With 'cruiser' tanks similarly armoured as compared to heavier but slower infantry tanks, convergence of cruisers and infantry tank designs (aided by economic, maintenance and logistic advantages) led to the emergence, by the end of the war, of one type of tank which can be called the Main Battle Tank (MBT). The MBT was meant to undertake all roles.

### ***Tank vs Tank***

The Second World War saw the 'heyday of the tank'. As mentioned above, this period saw the 'sudden development' of the tank and the doctrine of its mass employment. Post the war,



three main tank manufacturing countries viz. Britain, USA and the USSR (Germany was then *hors de combat*), produced and extensively used/exported the Centurion, M-47/48 Pattons and the T-54/55 tanks. These set the benchmark for the MBT. Later, the 1967 Arab-Israeli War again proved the tank's efficacy in tank vs tank battle. This led to the acquisition of tanks by every big and small army. Development efforts were generally focused on the conviction that the best defence against a tank was another tank— this led to both 'armour on tanks' and the 'guns on tanks' to increase in weight and size. When the size of the gun reached its limits, it was sought to be offset by more effective anti-tank ammunition (high explosive anti-tank, tungsten cored armour piercing, armour piercing discarding sabot and the same in fin stabilised form — HEAT, AP, APDS, APFSDS etc.) and ATGMs being fired through the tank gun. The latter started with the US 152mm MGM-51 Shillelagh, and thereafter was being tried out by many other armies. This concept has not been fully successful or is still in the development stage like India's SAHMO for the Arjun Tank.<sup>13</sup>

Whenever an advanced technology brings an advantage to the MBT, counter technology measures soon follow to negate it. Resultantly, the classic tank presently comprises myriad antennae, electronic & optic devices and reactive armour spouting all over it. While this makes the tank more protected/effective, it also increases the effect of small arms fire/shrapnel to degrade the modern MBT. The war in Ukraine has seen a reduction in use of tanks to destroy tanks — maximum tanks were destroyed by infantry/drone launched ATGMs and artillery, both targeting lighter upper armour.

### **Argument against the Tank and the Exchange Ratio**

This article does not base its argument against the tank on the basis of effectiveness of ATGMs launched from ground or by air, though the figures available in open source indicate their effectiveness. Rather, it bases the argument on the relative cost of weapon systems. With a modern Western MBT costing up to US\$10 million, depending on its final fit, it can be destroyed by a next generation single use light anti-tank weapon (NLAW) which costs



around US\$40,000<sup>14</sup> or a multiple use Javelin which costs US\$ 178,000 wherein each subsequent missile costs US\$ 78,000.<sup>15</sup> With an exchange ratio is so lopsided, even the richest nation cannot sustain a long war.

Tanks cannot get bigger and heavier as then they become more vulnerable to another weapon system which is growing rapidly — the missile firing drone. Here too, the exchange ratio is adverse to the MBT as a drone is cheaper besides being more agile than the tank in most conditions. The Bayraktar TB2 costs around US\$ 5 million and the same amount for a control station.<sup>16</sup> Both assets are for multiple uses. Unlike against ATGM carrying infantry, the tank has very little integral armament against the drone. Keeping in view the above, future tanks will have to get lighter, agile and cheaper to adapt to modern battlefield. Tanks are still relevant, but over US\$ 5 million tanks are not. This brings us to the battleship analogy.

### **The Battleship Analogy**

The iron battleship is the most relevant example of ‘technology’ first permitting the construction of a heavily armoured fighting ship, and thereafter the same ‘technology’ making it obsolete due to the advent of airpower/the aircraft carrier. The battleship lasted just about 100 years from roughly 1859 till about 1959. However, there remains some debate on what warship had the distinction of being the “first battleship”. The French ocean-going ironclad *Gloire*, built in the late 1850s, was a classified armoured frigate, and could certainly be called an early battleship as it was the first ocean-going wooden ship plated with iron armour to be built by any country. Naval historians argues that Royal Navy’s HMS Monarch, built a decade later with guns mounted in two revolving turrets, should be considered the first battleship.<sup>17</sup> Losses of battleships — from submarines and aircraft, in the Second World War quickly convinced all naval powers about the unsustainable exchange ratio of the battleship. This was both in terms of lives and lucre lost. In present times, even its vastly smaller cousin — the ‘cruiser’, is held by only five to six navies, overwhelming number being held by the



USA. Even the smaller ship — the ‘destroyer’, is now rare. If the heaviest armoured combat platform, at sea, loses its relevance in the face of an adverse exchange ratio, then there appears to be no reason to doubt that the same will not happen to the MBT — the heaviest armoured combat platform on land.

### **Future of the Tank**

In terms of time, the tank has been around for a little over a century. There are visible indicators that, keeping in view the advances in detection and targeting technology and a change in the manner of waging war, it can soon become unsustainable or redundant. In addition, the classic terrain over which armoured formations can ideally mass and manoeuvre, has changed. Tanks have always been at a disadvantage in urban terrain but now have become more vulnerable in open terrain also. Today, some 56% of the world’s population — 4.4 billion people — live in cities. By 2050, the urban population and along with that, urban conglomerations, will increase to more than double, with nearly 7 of 10 people in the world living in cities.<sup>18</sup> Russian tanks have found it hard to operate in the suburbs of Kiev or other urban areas.

Continuing to have US\$10 million tanks taken on by US\$100,000 Javelins<sup>19</sup> or US\$50,000 to US\$60,000 Krasnopol/Kvitnyk (the Ukrainian version of Krasnopol)/Excalibur or a swarm of US\$1500 RPG7s<sup>20</sup>, is not sustainable for anyone including a superpower. The rising cost of the MBT and increasing effectiveness of hand-held anti-tank weapon makes it inevitable that tanks, and in particular MBTs, are increasingly unsustainable on the modern battlefield. The MBT therefore needs a makeover if it is to continue to be a useful weapon system.

In line with their mission, the US Marine Corps, which in 2019 possessed over 400 tanks<sup>21</sup>, retired almost all the M1A1 Abram tanks in 2020 and eliminated all of its tank units.<sup>22</sup> The US Marine Corps Commandant Gen David Berger wrote of the tanks in a March plan for the Service’s overhaul — “Heavy ground armour capability will continue to be provided by the US Army”.<sup>23</sup> It goes without saying that, keeping in view the changes in the targeting



technology, tanks will need a new doctrine & tactics and be then made compatible with those and a combined arms fit.

## **Conclusion**

When Liddell Hart wrote about the flawed thinking of tanks having become obsolete, he was looking back at a 40-year timeline. and he was correct within that time line. We are now looking 100 years back and to believe that what Liddell Hart said in 1960 is still equally relevant, can be certainly open to question. At present, the greatest drawback of the tank is the adverse exchange ratio which can result in the battlefield being saturated with foot or air mobile ATGMs and precision anti-tank artillery. Some analysts state that, such saturation in the Ukraine war by Ukrainians is an anomaly, as only the combined efforts of the West have enabled Ukrainians to be flush with ATGMs to achieve the saturation. However, such saturation can also be achieved in case a nation has a clear doctrine for warfighting and a clear equipping philosophy based upon that doctrine. Anti-tank weapons can then be procured or produced by offsetting the cost against the philosophy of having MBTs for deep offensives. The MBT is certainly important for a non-status quo philosophy — but not so much for a status quo power which has a defensive philosophy. The high cost of a weapon platform translates into reduced production/acquisition, resulting in short supplies. The converse is true for lower cost weapons.

It may be possible to protect future tanks with electronic defences and active protection systems that offer electronic armour instead of only steel to protect against portable anti-tank weapons. This opens the possibility of reducing armour thickness and having lighter and faster tanks with greater ability to traverse through terrain with poor trafficability. An armoured vehicle will always play a role in the modern battlespace, especially as it is a mobile weapon platform with NBC protection. There is no doubt that such platforms act as force multipliers. It is the 'degree of armour' which is in question and which adds to weight, engines and cost.



When preparing for change, there is a requirement to be clear as to why the change is required, what changes do you require, with that change what do you want to accomplish, in what time frame do you want the change to happen, and a basic plan of how to accomplish the change. This article concludes that:

- There is a requirement to change the concept of MBT because an expensive heavy tank leads to an extremely unfavourable exchange ratio.
- There is a requirement to have lighter tanks to avoid being restricted to areas which are more trafficable. Light tanks can also be redeployed more easily from one sector to another.
- Lighter tanks with greater mobility, smaller signature, and electronic protection can influence the battle with a swarm effect. They can also operate better in an urban terrain within a city.
- This change should take place in a 10-year time frame because longer time frames lead to technology/doctrine obsolescence and a requirement to restart again.
- The Indian Army should abandon its quest to have tanks as heavy as the Arjun Mk2. It should plan on having a tank which overcomes the problems of the present-day concept of an MBT, possibly through its Future Ready Combat Vehicle (FRCV) program.<sup>24</sup>

There is enough empirical evidence to say that the MBT, as we presently know it, is not a cost-effective way to win wars. We should either accept this reality now or be prepared to accept it in the near future. The concluding assessment is that the era of the MBT is nearly over. Its economical exchange rate negates its usefulness. However, tanks which have gun/missile firepower, electronic means of stealth, speed, agility and are light enough to be lifted by air, would be a battle winning factor with those armies, who also expend a proportionate effort in ATGM drones and helicopters. Since the timeline for the development of tanks is very long, hence we need to take a decision now as to what type of tanks we will



need 10 to 20 years hence and then plan their development/acquisition accordingly. This should be done with speed.

The case for the FRCV was conceived and moved by the Directorate General Mechanised Forces around 2015. Sadly, as on May 2021 it has moved to only the Request for Information (RFI) stage<sup>25</sup> which is the first stage for acquiring a new system. Hopefully, because it is based on the Strategic Partnership model (not existing in 2015) which envisages development by private industry with a foreign Original Equipment Manufacturer (OEM), it has a chance to meet its timeline of the first production in 2030. Presently, out of the 12 steps before signing of the contract<sup>26</sup>, the FRCV have just reached the first step (RFI). The next step is the all-important 'formulation of the Services Staff Qualitative Requirements' (SQRs). The FRCV as in the RFI, is a 'Medium Tank'. Since, the classification of 'Medium' is open ended, there is a requirement for those formulating the SQRs to stick to a yardstick of upper weight limit. In the opinion of this author, a firm 40-ton limit is a good cut-off, ideally it can be lesser to cater for the inevitable add-ons of future technology. The SQRs should thereafter be realistic all through, including at the collegiate stage, to avoid a situation of adding additional features to the SQR which keeps on increasing the weight and complexity of the FRCV. India needs an 'indigenous tank but it does not need another Arjun MBT'.

## End Notes

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<sup>1</sup> Stephen Mihm, "Battle Tanks Are Always Outmoded but Never Obsolete", *The Washington Post*, March 28, 2022. Battle Tanks Are Always Outmoded But Never Obsolete - The Washington Post.

<sup>2</sup> JP Harris, *Men, Ideas and Tanks, British Military Thought and Armoured Forces, 1903-1939*.

<sup>3</sup> Ibid. (Manchester: Manchester University Press; 1995).

<sup>4</sup> Stuart Crawford, "Quality or Quantity? The Tank Conundrum", *UK Defence Journal*, July 27, 2022, Quality or Quantity? The Tank Conundrum ([ukdefencejournal.org.uk](http://ukdefencejournal.org.uk)).

<sup>5</sup> As per the Military Balance 2021 Armenia had 108 MBTs and Azerbaijan 437.



<sup>6</sup> Stijn Mitzer and Jakub Janovsky in collaboration with Joost Oliemans, Kemal, Dan, and naalsio26. Attack On Europe: Documenting Russian Equipment Losses During The 2022 Russian Invasion Of Ukraine. *Oryx*, 22 Feb 2022. <https://www.oryxspioenkop.com/2022/02/attack-on-europe-documenting-equipment.html>.

<sup>7</sup> Matthew Gault, "Stop Saying the Tank Is Obsolete Just Because Russia Sucks at Using Them", 19 April 2022, *Vice*, Stop Saying the Tank Is Obsolete Just Because Russia Sucks at Using Them ([vice.com](https://www.vice.com)).

<sup>8</sup> Director, Operational Test & Evaluation (DOT&E), "Javelin Antitank Missile," in FY 2015 Annual Report (Washington, DC: U.S. Department of Defense, 2016), 2016javelin.pdf ([osd.mil](https://osd.mil)).

<sup>9</sup> Steven Whitmore, "Javelin Close Combat Missile System (CCMS) Provides Unparalleled Defeat Capabilities," *Army AL&T*, July-September 2009, [https://asc.army.mil/docs/pubs/alt/2009/3\\_JulAugSep/articles/37\\_Javelin\\_Close\\_Combat\\_Missile\\_System\\_\(CCMS\)\\_Provides\\_Unparalleled\\_Defeat\\_Capabilities\\_200907.pdf](https://asc.army.mil/docs/pubs/alt/2009/3_JulAugSep/articles/37_Javelin_Close_Combat_Missile_System_(CCMS)_Provides_Unparalleled_Defeat_Capabilities_200907.pdf).

<sup>10</sup> Inputs gleaned from translation of Russian language content at [t.me/RVvoenkora](https://t.me/RVvoenkora) on Telegram.

<sup>11</sup> TR Fehrenbach in his acclaimed history of the Korean war "This Kind of War: A Study in Unpreparedness".

<sup>12</sup> 137,000 is the normal Russian annual induction of conscripts including for non-army armed police/border police. Apparently, all the input is now being fed into the army.

<sup>13</sup> Cannon Launched Missile Development Programme (CLMDP). <https://www.drdo.gov.in/cannon-launched-missile-development-programmeclmdp>.

<sup>14</sup> Peter Suicu, Javelin Or NLAW – Which Missile Is Better At Destroying Russian Tanks?, 1945. May 11, 2022. <https://www.19fortyfive.com/2022/05/javelin-or-nlaw-which-missile-is-better-at-destroying-russian-tanks/>.

<sup>15</sup> Ibid.

<sup>16</sup> Bayraktar TB2. *Military Today.com*. [https://military-today.com/aircraft/bayraktar\\_tb2.htm](https://military-today.com/aircraft/bayraktar_tb2.htm).

<sup>17</sup> Peter Suicu, "Meet HMS Vanguard: The Last Battleship Ever Built", 1945, Apr 12, 2022, <https://www.19fortyfive.com/2022/04/meet-hms-vanguard-the-last-battleship-ever-built/>.

<sup>18</sup> Urban Development, World Bank, <https://www.worldbank.org/en/topic/urbandevelopment/overview#2>.

<sup>19</sup> Matthew Gault. Op cit..

<sup>20</sup> Approximate cost of one launcher and one rocket .Top 10 Anti-Tank Rocket Launchers | *Military-Today.com*.

<sup>21</sup> Joseph Trevithick, "The Last Tank Has Left Marine Corps Base 29 Palms, Soon The Entire Service", *The War Zone*, <https://www.thedrive.com/the-war-zone/35198/the-last-tank-has-left-marine-corps-base-29-palms-soon-the-entire-service>.

<sup>22</sup> Chad Garland, A farewell to armor: Marine Corps shuts down tank units, hauls away M1A1s, *Stars and Stripes*, Jul 30, 2020, A farewell to armor: Marine Corps shuts down tank units, hauls away M1A1s | *Stars and Stripes*.

<sup>23</sup> Ibid.



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<sup>24</sup> Ghanshyam Katoch, "The Arjun, a Black Swan and the Future Ready Combat Vehicle", *CLAWS*, Aug 14, 2015. <https://archive.claws.in/1421/the-arjun-a-black-swan-and-the-future-ready-combat-vehicle-ghanshyam-katoch.html>.

<sup>25</sup> Request For Information (RFI) Future Ready Combat Vehicle (FRCV) For Indian Army. <https://www.ddpmod.gov.in/sites/default/files/RFI-FRCV%2024%20May%2021%20FINAL%20%20Amended%201020%20hr.pdf>.

<sup>26</sup> Government of India, Ministry of Defence *Defence Acquisition Procedure 2020*. Chapter VII - Revitalising Defence Industrial Ecosystem through Strategic Partnerships, (pp 479 – 524) [https://www.ddpmod.gov.in/sites/default/files/DAP%202020%20%2011%20Nov%2021\\_0.pdf](https://www.ddpmod.gov.in/sites/default/files/DAP%202020%20%2011%20Nov%2021_0.pdf).

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**CENTRE FOR LAND WARFARE STUDIES (CLAWS)**

RPSO Complex, Parade Road, Delhi Cantt, New Delhi 110010

Tel.: +91-11-25691308, Fax: +91-11-25692347, CLAWS Army No. 33098; Email: [landwarfare@gmail.com](mailto:landwarfare@gmail.com)

Website: [www.claws.in](http://www.claws.in)