Vol 4, Issue 18, Jul-Sep 2022 Quarterly Magazine ₹ 150/-

# rakṣha ANIRVEDA

PURSUING SELF-RELIANCE IN DEFENCE

## BRINGING LIFE INTO THE STILLBORN

Focus on Developing Indigenous Capability to Secure P-75 (I) Submarine Project

### Hiccups in India's Military Reforms

The Reforms in India's Military Reek of An Ad hoc-ism Where Bureaucrats Wield Supremacy

### Making a Virtue of Neutrality

India's Neutral Stance Toward Russia is Guided by Its National Interest

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**RESPONSE**

*'Raksha Anirveda'* editorial team looks forward to receiving comments and views from the readers on the content of the magazine.

# Editorial

## NAVIGATING THROUGH GLOBAL HEADWINDS

Half way into 2022, the humanity is staring at a grim future. The Russia-Ukraine War is turning out to be multi-dimensional with involvement of global players impacting lives across the world. The long-drawn War has been a wakeup call for one and all, including India. Faced with formidable diplomatic challenges and aware of its role in ensuring strategic stability, India has been recalibrating its great power relations.

With interests across the US-China divide, India has an important role to play in building a multipolar world order. And this depends on how pragmatically it uses its strategic and economic balance that weighs in on both sides of the divide. India's interest lies in resurrecting a potent United Nations, curbing the world's further slippage into a complex web of increased confrontations, strengthening safety systems while retaining its strategic autonomy in the international politics.

As the yearlong celebration of *Azadi Ka Amrit Mahotsav* reach their culmination on August 15, India needs to take a momentary pause for a rethink! The rampant ad hocism in military reforms, policy making and implementation is having an adverse impact on its economic growth story and its rise as a responsible power.

The announcement by the government of *Tour of Duty or 'Agnipath'* – a four-year contractual service scheme and its hasty implementation made it look more like creating an illusion with political motives and less towards addressing the needs of the armed forces. The armed forces will have to cautiously ensure that the reform is treated with care to pass the sociological, professional, institutional and strategic logic tests. The government should also prioritise to resolve the long-pending issue of national security management. As a rising power, it's important for India to have a comprehensive National Security Strategy.

The initial success of government's initiatives (Atmanirbhar Bharat, Make in India, iDEX, Technology Development Fund etc.), reasonable funding support and armed forces reaping the benefits from its interaction with industry and academia clearly affirm that the future lies in *Atmanirbharta in Defence*. One hopes that the momentum with focus on indigenisation continues and the long overdue procurement of submarines, naval utility helicopters, multi role combat aircraft, small arms and ammunitions, artillery equipment and tanks is fast-tracked on a priority basis.

Understanding the importance of defence exports both for domestic defence industry's vibrant growth and power projection, the focused policy initiatives of government are yielding positive results. India's military diplomacy is evolving further and the reenergised activism (bilateral and multi-national exercises, humanitarian assistance and disaster relief (HADR) operations) across the continents by Indian Navy have added multi-hued dimensions to Indian diplomacy. Moreover, Indian Navy will be unveiling its first ever unclassified version of the "Unmanned Roadmap" about the underwater capabilities at the conclave '*Swavlamban 2022*' to give the private industry a peek inside the navy's requirement for underwater vehicles.

We, at *Raksha Anirveda*, hope that readers will find going through the July-September edition a richly rewarding experience. Please feel free to share your feedback with us. As a apt tribute to the country's celebrations of 75 years of independence, *Raksha Anirveda* will be publishing a special feature on August 15 – INDIA @ 75 IN THE NEW WORLD ORDER on its website. It will cover wide ranging topics and provide a glimpse into the emergence of India as a responsible stakeholder.

***Jai Hind!!***

**Ajit Kumar Thakur**
*Editor & Business Director*

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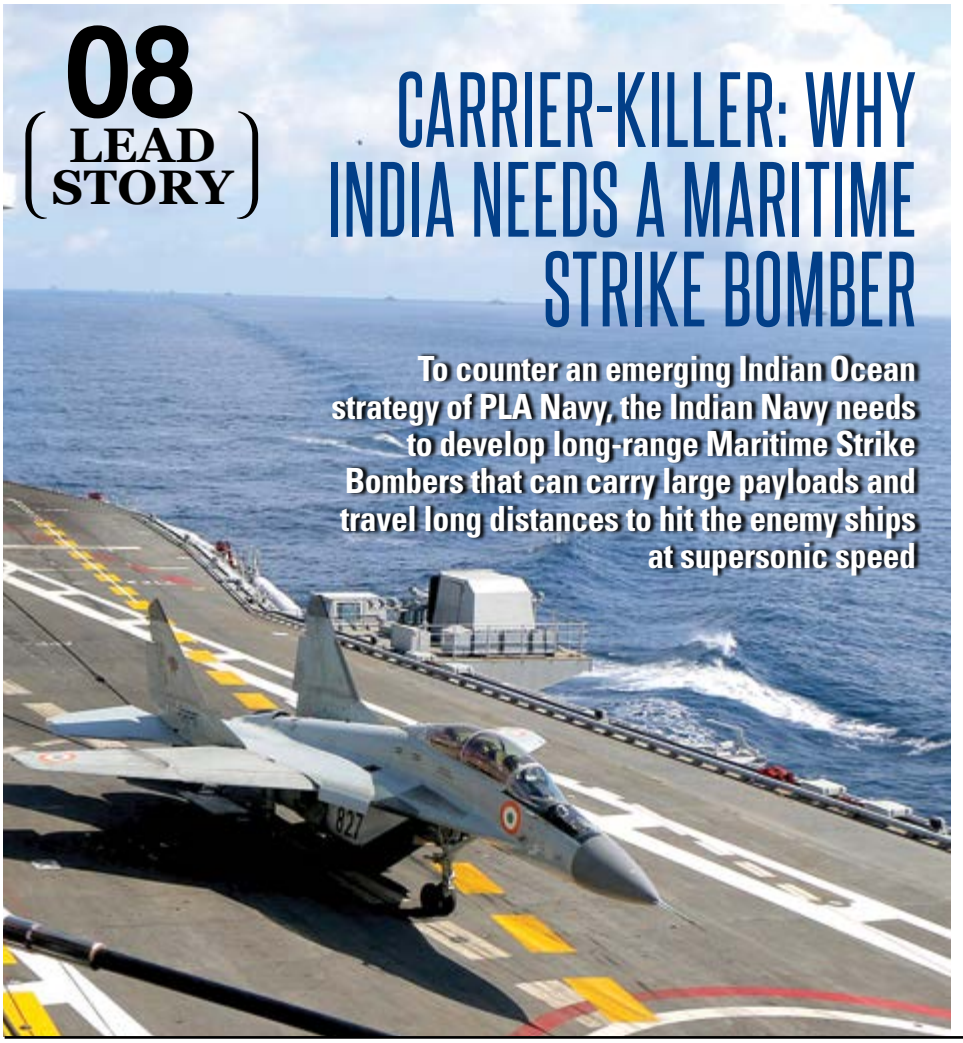

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RAZOR CUT

# HICCUPS IN INDIA'S MILITARY REFORMS

The reforms in India's military reek of an ad hoc-ism where bureaucrats will continue to wield supremacy over the men in uniform

By **LT GEN PRAKASH KATOCH**

Reforms in the military is a continuous effort taking into account the future threats, changing nature of warfare, the future battlefield environment and the impact of critical and emerging technologies on war-fighting. Military reforms need to be synonymous with Revolution in Military Affairs (RMA), best defined as: "A major change in the nature of warfare brought about by the innovative application of technologies, which combined with dramatic changes in military doctrine and operational concepts, fundamentally alters the character and conduct of operations."

Military reforms or transformation must have a political direction, a holistic defence review and timed plans (short, medium and long-term) to effect changes in the military in terms of doctrine, organization, technology, training, tactics, man-machine mix and force application. But, military reforms in India are hiccupping away—and can be best described as an exercise in 'ad-hocism'.

75 years after Independence, we still do not have a National Security Strategy (NSS). HQ Integrated Defence Staff (IDS) gave presentations to two different NSAs on how military can help draft NSS but they were uninterested.

The present NSA, tasked to define the NSS in 2019, has failed to produce—possibly because NSS would imply accountability of policy makers and the blame cannot be deflected to the military when setbacks occur.

Political directions cannot be limited to the need to integrate, which even the then Prime Minister told the Combined Commanders Conference on October 25, 2004. The US and German militaries transformed holistically through the Goldwater-Nichols Act and the Berlin Decree respectively. India needs an Act of Parliament to transform its military, which can be drafted by the NSCS, HQ IDS or a Think-Tank. But with the focus of the policy makers on votes and elections, we don't even have a NSS.

A Comprehensive Defence Review (CDR) would have told us that one Division (which also feeds manpower for the Northern Glacier) defending 800 km of frontage is fraught with dangers. But no CDR has been done.

From NSS and CDR should flow the military doctrine, organizational changes, equipping and the like. That is why the mad rush took place to import weapons and upgrade our own defence industry when China kicked us in Ladakh during 2020. Without NSS and CDR, defence procurement will continue to remain adhoc, and so will military reorganization and modernization.

The call for self-sufficiency in defence is correct but issuing periodic lists banning import of items without taking into account indigenous capacity and timeframe in which requirements of Armed Forces would be met is only seeking political plaudits.

Under the much publicised Strategic Partnership (SP) model to boost indigenous production through tie-ups with foreign armament majors, not a single project has taken off under the 'Make in India' policy till now though Ministry of Defence (MoD) had identified new-generation submarines and helicopters to advanced fighters and futuristic main battle tanks (MBTs) as long-term

A military ceremony

joint ventures under this model.

Arms industries in countries with modern armies are private sector-based, exception being communist countries like China where inefficiency and corruption is severely punished. Our Ordnance Factory Board and 41 Ordnance Factories should have been privatized instead of converting to public sector undertakings under the same leadership, work force and work culture for the sake of votes.

For the same reason, large parts of the Defence Research and Development Organization (DRDO) need to be privatized. Isn't it ironic that after so many years, we have not been able to build indigenous aero-engines, gas turbine engines for our naval vessels and our ammunition production and metallurgy is just about satisfactory.

Appointment of a CDS heading the Department of Military Affairs (DMA) was a bureaucratic masterstroke: merging HQ IDS with MoD was killing; seniority of service chiefs to secretary-level officers was brought down; all power, capital acquisitions and policy (in no-war-no-peace and war) remained with the defence secretary; CDS became military advisor to the Defence Minister (instead of Prime Minister/government) to whom Service Chiefs also have direct access; DMA was crammed with bureaucrats with the CDS reduced to do whatever bureaucrats said.

The government has now enlarged the scope of selecting the next CDS by also including serving Lieutenant Generals. Media has reported that the posts of CDS and Secretary DMA may be separated, which may imply a bureaucrat as Secretary, DMA, further degrading the CDS.

Bureaucrats have successfully retained their predominance in the government, with politicians being dependent on them. The half-hearted experiment of the present government to induct JS-level officers into some ministries (with MoD) untouched) was more of a PR exercise, knowing they must follow the two layers of IAS above them.

The CCS note under which HQ IDS was established on November 23, 2001, read: "As and when the CDS is appointed, he will have

UNDER THE MUCH PUBLICISED SP MODEL TO BOOST INDIGENOUS PRODUCTION THROUGH TIE-UPS WITH FOREIGN ARMAMENT MAJORS, NOT A SINGLE PROJECT HAS TAKEN OFF

Troops during training

# RAZOR CUT

Police action during the protest against Agnipath scheme

WITH 75% SOLDIERS RELEASED AFTER FOUR YEARS WITHOUT 'ASSURED' JOBS HAS PITFALLS, WHICH IS ONLY BEING ADDRESSED THROUGH RANDOM STATEMENTS

equal voting rights as Service Chiefs and in case two Service Chiefs disagree, MoD (read bureaucrats) will arbitrate." This killed the CDS being a single-point advisor to the government.

India has two nuclear-armed hostile neighbours and the entire length of the border with China will need to be manned throughout. There have been calls for a long time to reduce the strength of the Army by application of technology. But all the technology that was inducted, barring a few drones, are those that don't match the equipment of the PLA.

Preceding the announcement of Tour of Duty (ToD) or 'Agnipath' scheme recruitment in the military, the deafening propaganda about high defence-pensions budget made no mention of expenditure on the seven lakh civilian-defence employees—all enjoying non-functional upgradation (NFU) allowance while serving, all retiring in HAG/HAG+ grade and One Rank One Pension (OROP) thereafter.

'Agnipath' will induct soldiers in the military with six-month training to serve for four years. The main reason behind this is fiscal savings, not one paisa of which will come to the defence budget.

The irony is that an Army Chief had proposed the ToD, which is now being executed in full force, replacing regular recruitment, with 46,000 to be recruited shortly. The logic of younger profile obfuscates that they will enter service with six-months training and it takes one-two years to be fully trained. This, alongwith the annual and casual leaves in four years will leave his/her employability to just two years plus. It should also be recalled that two years back a proposal to 'raise' the retirement age in the military was also under discussion.

Agnipath' will adversely impact combat effectiveness at the cutting-edge. Moreover, from the public briefing on June 14, it is apparent that the government wants to do away with the Army's regimental system, which is the bedrock of fighting arms especially in Infantry and the Armoured Corps.

Policeisation of the military will blunt the military's steel edge. Moreover, with 75 percent soldiers released after four years without 'assured' jobs has pitfalls which is only being addressed through random statements.

Speaking at Mussoorie on June 13, Defence Minister Rajnath Singh said India must be prepared for full-scale-war in future. But we don't seem to have an answer to Pakistan's proxy war other than killing terrorists in our own territory. When will we reply to Pakistan in the same coin? As for military reforms, these will likely continue hiccuping.

*-The writer is a veteran of Indian Army. The views expressed are personal and do not necessarily reflect the views of* ***Raksha Anirveda***

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ABSOLUTE POWER

# CARRIER-KILLER: WHY INDIA NEEDS A MARITIME STRIKE BOMBER

To counter an emerging Indian Ocean strategy of PLA Navy, the Indian Navy needs to develop long-range Maritime Strike Bombers that can carry large payloads and travel long distances to hit the enemy ships at supersonic speed

MiG-29K lands on INS Vikramaditya

By **RAKESH KRISHNAN SIMHA**

The fastest way to sink an enemy warship is by attacking it from the air. Modern combat aircraft can travel hundreds of kilometres an hour, patrol far from their bases, and use standoff weapons to destroy targets from a safe distance. This is something that a surface combat ship simply cannot do. Long-range naval aviation is a force multiplier component of all the major global powers. The Russians were the first to see the value of having dedicated land-based bombers to attack US Navy carrier battle groups. Their Tupolev Tu-22M 'Backfire' bomber was developed to hunt and destroy enemy surface ships in the vast expanse of the Pacific Ocean.

The United States – despite having a forward deployed navy with as many as 10 aircraft carriers – has modified its B-1B and B-52 air force bombers for maritime missions. China's People's Liberation Army Air Force (PLA Air Force) has a dedicated fleet of Xian H-6D strategic bombers armed with anti-ship cruise missiles.

Lt-General David Deptula of the US Air Force writes in Air Force Magazine: "In a modern threat environment, especially in the Asia-Pacific region, the advantages of using bombers in a maritime strike role is becoming more relevant to future military strategies, plans and budget priorities." Pairing long-range anti-ship missile (LRASM) with modern sensors, bomber aircraft can now conduct all-weather precision engagements against mobile maritime targets with less risk than naval vessels, and do so in hours, rather than days or weeks, he adds.

Maritime strike aircraft have three primary tasks:

- Anti-access – to destroy carrier battle groups or large flotillas out in the open sea; that is, before they come close to your shores.
- Their second – and equally important – role is to kick down the door of coastal air-defence systems, thereby making it safer for your navy to approach the enemy's coast.
- And finally, maritime bombers can devastate the enemy's mainland by launching cruise missiles from safe standoff distances.

Tupolev Tu-22M-3

FOR INDIA, THE TIME HAS FINALLY ARRIVED TO GO IN FOR A DEDICATED STRIKE BOMBER BECAUSE ITS PRIME ADVERSARY NOW HAS - AT LEAST ON PAPER - A POWERFUL BLUE WATER FLEET. CHINA'S PLA NAVY IS NO LONGER A LITTORAL FORCE

## CHINA IN THE INDIAN OCEAN

For India, the time has finally arrived to go in for a dedicated strike bomber because its prime adversary now has - at least on paper - a powerful blue water fleet. China's PLA Navy is no longer a littoral force. In 2020, it became the largest navy in the world, with an overall battle force of approximately 350 ships and submarines, including over 130 major surface combatants. In comparison, the Indian Navy has 150 ships and submarines.

In a report submitted to the US Congress, the US Defence Department noted the majority of the PLA Navy fleet is made up of "modern multi-role platforms" that host anti-ship, anti-air and anti-submarine weapons and sensors. Further, as part of modernisation efforts, the Chinese have embarked on a shipbuilding programme that includes submarines, surface combatants, amphibious warfare ships, aircraft carriers, and auxiliary ships as well as indigenous weapons, sensors and command and control systems.

Unlike some of the wildly exaggerated reports that come spinning out of the Pentagon, this report was spot on. On June 17, 2022, China launched its third and most advanced aircraft carrier from Shanghai's Jiangnan Shipyard. Named "Fujian", the warship is China's first domestically designed and built catapult aircraft carrier, and is equipped with new combat systems, including the electromagnetic catapult-assisted launch system, which is a major upgrade from the less advanced ski jump-style system used by India.

What's more, the US Defence Department says the PLA Navy is developing the capabilities and operational concepts to conduct offensive operations within both the Pacific and Indian Oceans. Chinese and outside naval experts speculate that the PLA Navy may have an Indian Ocean fleet in the near future. Supporting this possibility, multiple Chinese sources have started to articulate an emerging Indian Ocean strategy for the PLA Navy.

## ATTACK IS THE BEST DEFENCE

There are several compelling reasons for the Indian Navy to have its own dedicated carrier-killer and coastal bomber.

- By definition, a strategic bomber should have a minimum range of 8,000 km without refuelling and the capacity to carry a payload of more than 10 tons of air-to-ground ammunition, including several long-range cruise missiles. This means bombers have the range to attack enemy naval surface groups before they came within range of the Indian Navy ships. They can descend to low altitude, approach from different directions and launch salvos of anti-ship missiles such as the BRAHMOS to saturate enemy defences. What's more, bombers can replenish their weapons (LRASMs) in hours versus the days or weeks ships require.

# ABSOLUTE POWER

H-6N: latest variant of the Xian H-6

- If the Indian Navy detects a large enemy fleet that needs to be neutralised, it cannot expect to call in strikes by the IAF at a moment's notice. The chain of command makes this cumbersome if not impossible. (This is the reason why the Indian Army is raising its own fleet of assault helicopters instead of always being at the IAF's mercy.)
- The Air Force isn't waiting to respond to a call from the Navy. Its fighters could already be deployed – or committed for deployment – in other distant theatres.
- Air Force jets lack the range required to go looking for warships in the vast expanse of the ocean. Carrier-borne fighters – whose primary role is to defend the carrier – have even shorter ranges. For instance, the Indian Navy's MiG-29K – for safety reasons – rarely takes off with a full tank of gas, which severely limits its combat radius to well below its official 850 km range.
- Radars and avionics on Air Force jets are not always effective over water, and are in most cases useless. Without specialised equipment, an aircraft cannot tell whether a large contact held by its onboard radar is an aircraft

# MARITIME BOMBER DEP

## RUSSIA

The Russian Backfire was the world's first maritime strike bomber. With its combat range of 2400 km and a blistering speed of over 2300 kph (faster than most jet fighters), the Backfire is ideal for targeting aircraft carriers and large ships.

The Backfire's primary weapon is the supersonic Raduga Kh-22 cruise missile. Russian tests reveal that when a shaped charge warhead weighing 1000 kg was used in the Kh-22 missile, the resulting hole measured 16 ft in diameter and 40 ft deep. Not even the largest carriers can survive such an impact, and at the very least will be out of commission for months.

Bill Sweetman and Bill Gunston write in 'Soviet Air Power' that the missile is so accurate it could be "programmed to enter the correct Pentagon window". In fact, during the 1980s, Russian Naval Aviation was so sure about the accuracy of these missiles that the Backfire carried only one Kh-22, armed with a nuclear warhead.


Raduga Kh-22NA at State Aviation Museum Zhulyany

Today's Backfires are also equipped with the more advanced Kh-15. This missile climbs to an astounding 130,000 ft and then dives in on the target, accelerating to Mach 5, which makes it the world's fastest aircraft-launched missile.

According to Sweetman, the Backfires

carrier or other ship configured to simulate a carrier, a decoy, or a large and perhaps neutral merchant vessel.

- Air force pilots do not generally train for maritime missions. You want crews who do this for a living daily and have the experience to detect enemy ships on the turbulent ocean.

## COUNTERING THE CHINESE THREAT

China's fleet includes three aircraft carriers, 32 destroyers, 49 frigates, 37 corvettes, 21 medium landing ships, 37 amphibious transport docks, 86 coastal patrol missile boats, a cruiser, 46 diesel attack submarines, 6 nuclear attack submarines and 4 ballistic missile submarines. On top of having the largest naval fleet in the world, the combined aviation presence of the PLA Air Force and PLA Navy aviation constitutes the third-largest aviation force in the world and the largest in the region. (The firepower of the US Navy is several orders of magnitude greater than the PLA Navy's, and will be for several decades.) With such numbers at their disposal, the Chinese would be able to permanently deploy an aircraft carrier in the Indian Ocean in the coming years.

Instead of placing its naval assets within harm's way, the Indian Navy can threaten Chinese carrier battle groups by deploying maritime bombers. Dedicated squadrons can be stationed on secure airbases on the mainland or even the Andaman & Nicobar Islands from where these bombers can be vectored towards large naval targets. In a shooting war, these bombers can fire cruise missiles against a Chinese carrier from beyond the range of the carrier's own fighters; the pilots can then return to base and watch the carnage on CNN. The bombers can also be used to launch cruise missiles against cities on China's eastern seaboard.

If India acquires such a capability, it will be able to strike China from two sides – across the Himalayas as well as the east. This will complicate war planning for the Chinese political leadership, which is already on edge because of the Pacific Pivot – the massive redirection of US economic and military focus from the Atlantic to the Pacific Ocean.

## THE NAVY'S OPTIONS

Maritime bombers aren't available off the shelf so India's options are limited. It could buy or lease the Tu-22M from Russia. In fact, the Backfire was first offered to the Indian Air Force in 1971 – a few months before the India-Pakistan War – when Russia offered it as a strategic bomber. However, Air Chief Marshal P.C. Lal rejected the offer.

According to defence analyst Bharat Karnad, the "reasons trotted out verged on the farcical". "As Wing Commander (later Air Marshal) C.V. Gole, a member of the Air Marshal Shivdev Singh Mission to Moscow and test pilot, who flew the Tu-22M informed me, he was appalled by the fact that he had to be winched up into the cockpit, and that the plane would have to take off from as far east as Bareilly to reach cruising altitude over Pakistan!"

India could have bought these aircraft again – and at a huge bargain – in 1991 when the Soviet Union dissolved and Moscow was

THE US DEFENCE DEPARTMENT SAYS THE PLA NAVY IS DEVELOPING THE CAPABILITIES AND OPERATIONAL CONCEPTS TO CONDUCT OFFENSIVE OPERATIONS WITHIN BOTH THE PACIFIC AND INDIAN OCEANS. THE CHINESE AND OUTSIDE NAVAL EXPERTS SPECULATE THAT THE PLA NAVY MAY HAVE AN INDIAN OCEAN FLEET IN THE NEAR FUTURE

# LOYMENTS

were best at "scaring the bejesus out of carrier groups".

**UNITED STATES**

Seeing the utility of Russian maritime strike bombers, the US is transforming its B-1B and B-52 long range bombers as ship killers. The B1B is currently test-firing the Long Range Anti-Ship Missile (LRASM), which can avoid obstacles such as islands and commercial shipping, receive further targeting data via satellite, and adjust its flight path to avoid enemy air defences before descending on a fleet of enemy ships. What makes the LRASM/B-1B combination stand out is the sheer amount of firepower the heavy bomber can deliver. Just three bombers could launch 72 missiles at a target.

**CHINA**

China's Xian H-6D is a copy of the 1950s era Russian Tu-16 Badger bomber but with modern Russian turbofan engines which reportedly give it a combat radius of 3,500 kilometres. Introduced in the early 1980s, it is armed with two air-launched C-601 missiles, one mounted under each wing. An upgraded version, capable of carrying four anti-ship missiles, is currently under development.

These bombers are specifically targeted at US Pacific Fleet aircraft carriers. Although these slow bombers are likely to get shot down by American stealth aircraft in any engagement between the two countries, a few Xians could potentially get through the air defences of carrier battle groups and do serious damage.

# ABSOLUTE POWER

B-52 Stratofortress assigned to the 307th Bomb Wing


THE INDIAN NAVY CAN THREATEN CHINESE CARRIER BATTLE GROUPS BY DEPLOYING MARITIME BOMBERS

wondering what to do with 300 surplus Backfires. Although the Chinese have tried hard to buy the bomber or even its design blueprints – which is an indicator of the Backfire's continued utility – India has refused to accept what was offered to it on a platter.

Although still potent, the Backfire is essentially 1960s technology, and the aircraft may require considerable maintenance to keep it flying. Plus, with the Russians not exactly known for their after-sales service, the Indian Navy may not be keen to acquire the ageing warhorse.

Another option is to modify the Sukhoi Su-30MKI, which is currently manufactured at HAL. This will not only require major retooling to install specialised maritime radars and other sensors, but also involve extending the range of the aircraft. With drop tanks or aerial refuelling, the aircraft's considerable range can be extended further. However, the aircraft would be limited to firing just a single cruise missile such as the BRAHMOS. If the missile misses, the mission would be a failure.

Since the cost of transforming the Flanker into a maritime bomber is likely to be in the region of several billion dollars, and it still wouldn't give India a true strategic bomber, the next best option is to design one from scratch.

## MADE-IN-INDIA BOMBER

Developing a bomber isn't an easy task with the current level of aeronautical technology available in India. Even the Chinese are finding it hard to develop a more advanced version of their existing Xian aircraft. The editor of the Chinese language Defence Daily is sceptical about China's abilities to produce a modern long-range strike bomber in the short term, considering that it would require "a state-of-the-art structure and aerodynamic configuration as well as a high-performance turbofan engine".

However, the Chinese did manage to develop the Xian H-6D by reverse engineering during 1950s era Russian aircraft and cruise missiles. Plus, if they can build an 80,000 ton supercarrier in just seven years, they will eventually produce a strategic bomber that comes close to the capabilities of the US B-52 or the Russian Tupolev. The important thing is they are on the job whereas an Indian strategic bomber is not even in the picture.

If a dedicated joint sector company – on the lines of the highly successful BrahMos Aerospace – is set up today, then maybe India will have a bomber in 10 years. That is roughly the time frame it took the Defence Research & Development Organisation (DRDO) to bring the BRAHMOS cruise missile from concept to production. Back then luckily for India, President A.P.J. Abdul Kalam took a keen interest in the programme and used his clout to navigate the BrahMos through the Prime Minister's Office. Kalam also made sure bureaucrats – and corrupt generals – weren't able to sabotage the BRAHMOS. Today, there is a pro-military government which is pushing defence production as a priority, so an 'Indigenous Strategic Bomber' project could take off quickly without red tape dragging it down.

Maritime bombers are a more cost-effective gamechanger than matching an adversary with deep pockets. According to Lt-General Deptula, they can carry large payloads and travel long distances at a speed of 30 to 40 times faster than ships, while requiring a fraction of the resources and manpower to achieve commensurate combat effects.

The wonderful thing about strategic bombers is they often outlast the people who build them. This makes them highly cost-effective fighting platforms in the long run. The American B-52, which first flew in 1952, is an extremely robust flying machine that will in all probability be flying into the second half of this century, becoming the first centurion aircraft in history. The Russian Backfire could also hit the 100 year mark. China has built only 16 Xian bombers, suggesting these will be long-term assets. Similarly, if India develops a long-range bomber it will have a platform that will last decades, which means very little additional development costs.

*–The writer is a globally cited defence analyst. His work has been published by leading think tanks, and quoted extensively in books on diplomacy, counter terrorism, warfare and economic development. The views expressed are personal and do not necessarily reflect the views of* ***Raksha Anirveda***

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## UKRAINE WAR: IMPACT ON INDIA

# MAKING A VIRTUE OF NEUTRALITY

Amid the global clarion call for denouncing the invader Russia, India has maintained a measured neutral stance toward Russia. While this position may appear skewed in the global context, it is guided by India's core strategic and economic interests

By **MAJ GEN G SHANKARNARAYANAN**

The war in Ukraine is reverberating across the world with the cataclysmic human tragedy in terms of the scale of death and destruction ever witnessed since the Second World War, its economic strangulation and above all the threat to sovereignty of an independent state in a globalised word. Beyond the suffering and humanitarian crisis, the entire global economy has retarded into a sluggish growth fuelled by acute shortages of essential commodities, rising prices that has spiked inflation and last but not the least the widespread devastation of cities that no longer exist is unimaginable besides the utter disregard to international norms. In sum, the impact of this invasion is directly proportional to the proximity to the ground zero, Ukraine, a devastated country in its entirety and a Europe grappling with the surge of refuges, energy shortage, disrupted trade and severe impact on supply chain in general.

Amidst the global clarion call for denouncing the invader Russia, India on the other hand has a mixed bag of responses. Its diplomatic response has become an enigma and a topic of global interest. On the face of it India continues to "maintaining strategic autonomy," by strongly relying on its stated foreign policy of neutrality that aligns with its national interests. The direct fall out has been its refusal to toe the lines the West, chiefly the United States and its NATO allies in isolating Russia by abstaining from several votes in the United Nations Security Council and General Assembly on the issue of censuring Russia for its unprovoked attack on Ukraine. It has also abstained from resolutions brought in by Russia as well. In fact despite being part of the Western alliances such as the Quadrilateral Security Dialogue, it continues to buy weapons and oil from Russia. This tight rope walk of trying to balance its relationship with the West and Russia, with whom it has deep historical and strategic ties, has informally raised its stature as a mature democracy.

## INDIA'S STRATEGIC STANDPOINT

A deeper analysis of India's response to the Russian invasion of Ukraine has been very distinctive and measured among the major democracies around the world including the US and its strategic partners. Despite its discomfort with the Russian invasion, India has adopted measured public neutrality toward Russia. As highlighted earlier, it has abstained from successive votes in the UN Security Council, General Assembly, and Human Rights Council that condemned Russian aggression

President Zelensky with soldiers

ONE OF THE MOST SIGNIFICANT FACTORS OF INDIA'S BENIGN STANCE TOWARDS RUSSIA HAS BEEN INDIA'S CONTINUING DEPENDENCE ON RUSSIA FOR MILITARY EQUIPMENT. BUT IT IS ULTIMATELY SECONDARY TO THE LARGER CALCULATIONS THAT CENTRE ON PRESERVING STRONG TIES WITH RUSSIA AS PART OF INDIA'S EFFORTS TO BOTH BALANCE CHINA WHILE CONSTRAINING PAKISTAN AND REALISE A MULTIPOLAR SYSTEM WHERE IT CANNOT BE HEMMED IN BY ANY EXCESSIVELY POWERFUL STATES

in Ukraine and thus far has refused to openly call out Russia as the instigator of the crisis. For many in the United States, including in President Joe Biden's administration, India's neutrality has been disappointing because it signalled a sharp divergence between the US and India on a fundamental issue of global order, namely, the legitimacy of using force to change borders and occupy another nation's territory through a blatant war of conquest. Whatever their views on the genesis and the precipitants of the Ukraine war, the global community would admit that India's diplomatic neutrality ultimately signifies a subtle pro-Russian position based on its years of diplomatic interdependence tilting more in favour of India's defence and security needs. This seems particularly incongruous today because India stands shoulder-to-shoulder with the United States in opposing Chinese assertiveness in the Indo-Pacific while at the same time appearing tolerant of the vastly more egregious Russian belligerence in Europe.

That notwithstanding India has also managed to convey its perception on the crisis that has caused a human catastrophe explicit in the immeasurable exodus, damage and destruction of human lives and property. These perceptions have been put forth by way of India urging "respect for the sovereignty and territorial integrity of states," calling "for the immediate cessation of violence and hostilities," and regretting "that the path of diplomacy was given up". It strongly urged the concerned states to "return to diplomatic dialogue," and reiterated that "dialogue is the only answer to settling differences and disputes, however daunting that may appear at this moment." Its reiteration of its position "that the global order is anchored on international law, the UN Charter and respect for the territorial integrity and sovereignty of states" further amplifies India's stand on the invasion without directly contributing to the global tirade. India thus sought to convey its consternation with Russian actions, but refused to condemn Moscow transparently.

# IN DEPTH

Prime Minister Modi with Ukrainian President Zelensky and Russian President Putin

BIG FIRMS SUCH AS GOOGLE PAY, APPLE PAY, AND MASTERCARD PULLED OUT OF RUSSIA FOLLOWING THE UKRAINE CRISIS, AND RUSSIAN BANKS WERE CUT OFF FROM SOCIETY FOR WORLDWIDE INTERBANK FINANCIAL TELECOMMUNICATIONS (SWIFT) PAYMENTS SYSTEM

## PERCEIVED INTEREST FOR INDIAN PUBLIC NEUTRALITY

In the first instance, India's public neutrality toward the Russian invasion is driven fundamentally by its concerns vis-à-vis China and Pakistan. Both these states are immediate and enduring threats, and it believes that preserving its friendship with Russia will help to prevent deepening Russian ties with China and to limit Russian temptations to build new strategic ties with Pakistan. Both China and Pakistan desire closer ties with Russia which India is not comfortable with. Consequently, the aim to minimise Russian proximity to both of its rivals is a strategic necessity. Toward that end, it has concluded that studiously avoiding any open criticism of Russia offers it a chance to arrest the tightening Sino-Russian embrace while preventing a new dalliance between Russia and Pakistan, both of which undermine India's core interests.

Another serious consideration to reinforce this geopolitical calculation has been the long standing relationship with Russia since 1955 when the erstwhile Soviet premier Nikita Khrushchev publicly declared his support for Indian claims over Jammu and Kashmir. Keeping Russia on its side through its veto-wielding prerogatives thus remains an important consideration which reinforces India's reticence to criticise Russia, even when its behaviours are judged to be deplorable and on occasion undermining India's vital interests. On this count, India's posture today remains fundamentally consistent with its past forbearance in the face of previous Russian aggression, for example, in Hungary in 1956, in Czechoslovakia in 1968, and in Afghanistan in 1979. Thus India has been excessively considerate when calling out Russian misdemeanours, a courtesy that historically has never been equally extended to the United States.

In the face of this divergent response, the underlying reason for this asymmetrical treatment is that India now has a durable view of Russia as a "dependable partner." The evidence often trotted out in justification is that Russia supported India against US pressure during the 1971 Indo-Pakistan war and it has never meddled in Indian domestic politics, unlike the United States, which has done so on many occasions. The evidence undermining this unfair comparison with Washington despite US assistance including food aid to India early in its post independence history, US military and political support during the darkest moments of the 1962 Sino-Indian war when the Soviet Union was either ambivalent or supported China, and the more recent, US-Indian civilian nuclear cooperation agreement—unfortunately does not seem to credibly count, in contrast. Consequently, between the nostalgia about Russia being "a very reliable and long term partner" and the suspicion that the United States could prove to be "a fickle and uncertain strategic partner," the threshold that must be crossed to provoke any Indian public criticism of Moscow is extremely high.

That apart, one of the most significant factors of India's benign stance towards Russia has been India's continuing dependence on Russia for military equipment. It only deepens its reluctance to alienate Russia in any way. This aspect has received widespread attention since the beginning of the Ukraine war, but it is ultimately secondary to the larger calculations that centre on preserving strong ties with Russia as part of India's efforts to both balance China while constraining Pakistan and realise a multipolar system where it cannot be hemmed in by any excessively

powerful states. All the same, the current dependence on Russia for the much needed spares and support necessary to maintain its large inventory of Russian-origin military equipment is factually real and cannot be dispensed with.

However in this growing ambivalent geopolitical state, India has begun to diversify its arms purchases away from Russia during the last two decades. That apart, Russia still remains a critical and a highly desirable source of weapons for India. This is because Russian weapons are usually cheaper in comparison to their Western counterparts, at least as far as their initial costs go, and they are often just as good, or at least good enough, for India's operational needs. Moreover, Russia alone, again in contrast to the West, is often willing to provide India with the high-leverage strategic technologies that others will not, has pursued the codevelopment and coproduction of advanced weapons systems to pave the way for their manufacturing in India, and does not burden India with excessive end-user constraints, thus making India's defense relationship with Russia even more valuable. The bottom line, therefore, is that India would be unwilling to jettison the defense supply links with Russia, even if it could procure comparable weapons from alternative Western sources, because the tie with Russia offers it important technological and political benefits.

Having said all this, Indian policymakers are aware of the risks accompanying their current public neutrality toward Russia. It exposes the inconsistency in India's commitment to protecting the rules-based order in the Indo-Pacific over that in Europe, at a time when its biggest international partners, economic and strategic, are both united in their determination to penalise Russia and at odds with India's posture on Ukraine. It also leaves India in the company of strange bedfellows such as China and Pakistan, which happen to be India's adversaries and have behaved toward India as Russia has toward Ukraine.

## INDIA'S ECONOMIC OPPORTUNISM

From a positive standpoint, India's political neutrality over the war in Ukraine has expanded its economic opportunism. For starters, India has boldly gone ahead with importing Russian oil at a much cheaper rate. The stated position of the government has been that the Government of India's motivations are purely economic, not political and in the interest of its people. China also seems to follow a similar strategy of oil imports. Thus these actions grossly undermine the intended financial strangulation of Russia by way of western economic sanction. In so far as India is concerned it seems to have a dual impact of projecting Indian diplomatic independence, even evoking applause from its adversary namely Pakistan, and a perceived alignment with China in resisting western pressures.

## INDIA'S URGE FOR SELF-RELIANCE

One of the significant fallouts has been to spur a self-reliant or Aatma Nirbhar Bharat in the aftermath of the Ukraine crisis. In fact, the perceived backlash of big technology companies "weaponising internet and presiding over splinternet" amidst the Ukrainian crisis has been worrisome. On the contrary, India has the potential to reverse this trend where big technology firms like Google Pay, Apple Pay, and MasterCard pulled out of Russia following the Ukraine crisis, and Russian banks were cut off from the Society for Worldwide Interbank Financial Telecommunications (SWIFT) payments system. Thus, there is a dire need to be self-reliant in this new geopolitical reality.

INDIA'S INDEPENDENT POSITION ON UKRAINE IS A MESSAGE TO CHINA THAT INDIA WOULD WITHSTAND US PRESSURE. IF THIS CAN LEAD TO SOME TRUST AND UNDER-STANDING BETWEEN CHINA AND INDIA ON THE BORDERS, IT CAN PAVE THE WAY FOR AN INFORMAL RUSSIA-CHINA-INDIA AXIS IN THE FUTURE

**Ukrainian soldier inspects the impact of bombing**

# IN DEPTH

Ukrainian Army in action

THE FACT THAT THE WAR HAS SPIKED SHORTAGES, PROMPTED INDIA TO MEET THE VOID BY WAY OF EXPORTS OF AGRICULTURAL PRODUCE. LARGE QUANTITIES OF WHEAT HAVE BEEN SHIPPED TO MEET THE GROWING GLOBAL DEMAND. UNFORTUNATELY, THIS HAS NOT BEEN WITHOUT ITS PITFALLS AND OPPOSITIONS FROM A FEW RETICENT COUNTRIES

Having said this, the immediate fallout has been a push for several reforms and policies to reduce import dependence. The key to this has been India's push for making domestic manufacturing viable and attractive for global companies through the production-linked incentive (PLI) schemes and public procurement orders that promote buying goods with more domestic content, similar to Biden's "Buy American" program. In addition, one of its technological strong points has been the roll out of Aadhaar, the world's largest biometric identification system. The success of Aadhaar, India Stack and its applications such as the Unified Payments Interface and electronic Know-Your-Customer platforms have fundamentally transformed several economic sectors in India. As Russian banks were cut off from SWIFT international system and tech companies pulled out of the country following Russian invasion of Ukraine, Indian experts pointed out how India Stack ensured that India would never fall prey to any blackmail by global tech companies. Thus companies and governments are embracing a more emboldened Indian government on the self-reliance front. The aim is to strengthen India's case for data localisation, creation of a resilient internet network architecture, develop a native open API (application programming interface), and a strong cyber security command centre, thereby making it a prominent feature of India's technology ambitions.

## IMPACT ON GLOBAL FOOD SECURITY AND INDIA

The ongoing war between Russia and Ukraine has spiked a global food crisis that stems from the fact that Russia and Ukraine are the granaries for the world in terms of wheat supply but are unable to maintain regular supply. Ukraine is amongst the largest global exporters of wheat, sunflower, barley, rapeseed and maize with share of 10 per cent, 47 per cent, 17 per cent, 20 per cent and 14 per cent of global exports. Russia also has strong presence with global exports of 25 per cent, 18 per cent and 14 per cent in sunflower, wheat and barley. However, given this impasse it is all set to positively benefit India agricultural economy. The fact the war has spiked shortages prompted India to meet the void by way of exports of agricultural produce. Large quantities of wheat have been shipped to meet the growing global demand. Unfortunately, this has not been without its pitfalls and oppositions from a few reticent countries. That notwithstanding the opportunity is huge for Indian agricultural sector.

In conclusion, it may be fair to assume that while Russia is unrelenting in its pursuit of its operations in Ukraine, the west on the other hand is arming Ukraine to fight their proxy war against Russia. There is, thus, no clear end to it at least in the near future. Four months into the war, the world has fallen into a state of an uneasy thaw where local priorities including the threat of a resurgence of Covid are lulling the war hysteria leaving the Ukrainians to fend for themselves. Under these circumstances, India's political ambivalence may appear skewed in the global context but it is highly favourable in the domestic landscape.

*–The writer is a former GOC-Indian Army and presently a Strategic Consultant & Principal Advisor. Views expressed are personal and do not necessarily reflect the views of* ***Raksha Anirveda***

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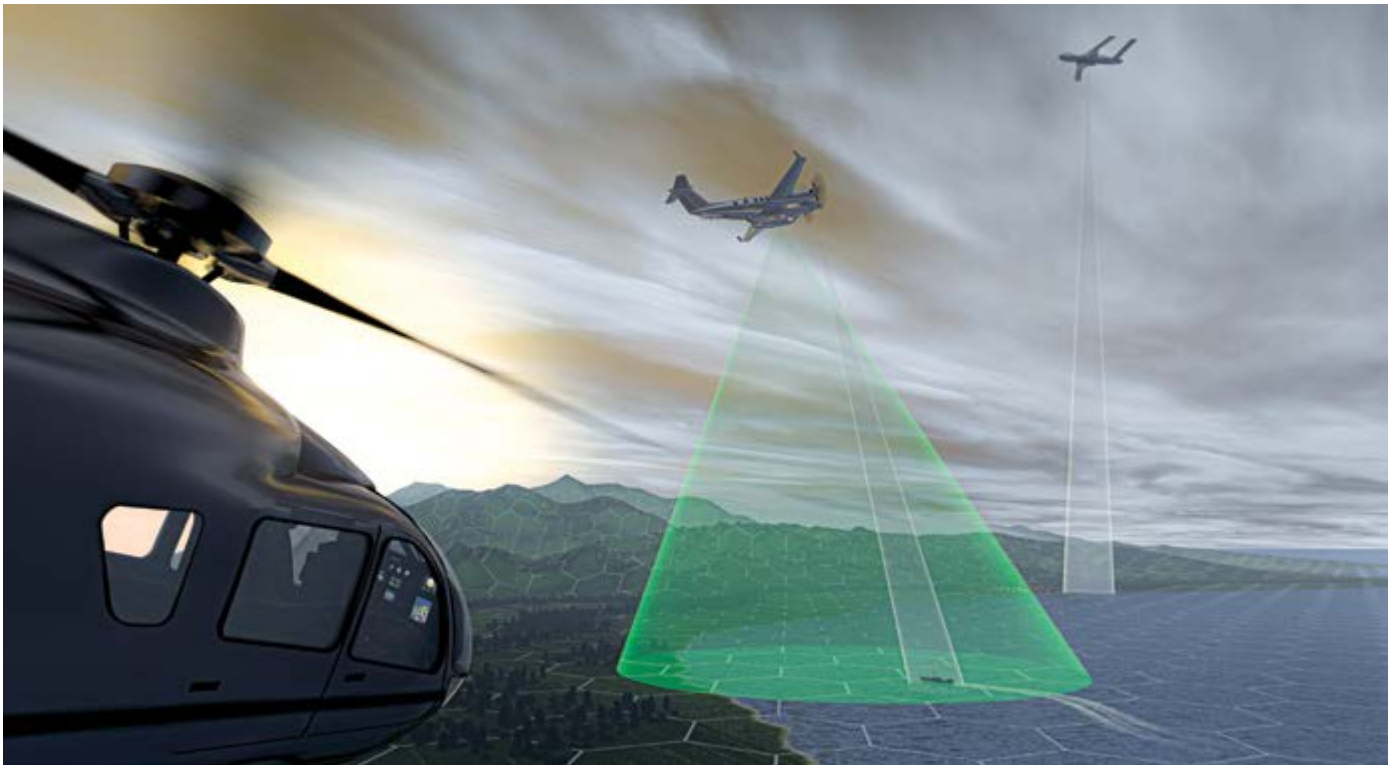

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## INDIA'S FIGHTER AIRCRAFT NEEDS

# STRATEGIES IN THE FACE OF GEOPOLITICAL AND ECONOMIC CRISIS

Having lost out big time due to short-sighted piecemeal procurements, India's acquisition process needs an overhaul and improve its track-record. With correct lessons derived and applied diligently, India can truly emerge as a globally competitive defence manufacturer and achieve control over critical technologies

By **AIR MARSHAL M MATHESWARAN**

The ongoing Russia-Ukraine war, now in its fifth month, has major lessons for India and rest of the world, not only in terms of the future of war and military operations but more importantly on the importance of military capability and technological sovereignty. The war will be studied for its various aspects: the role and effectiveness of air dominance and air defence, Ukrainian use of anti-tank missiles and shoulder-fired missiles, anti-shipping missiles, heavy use of artillery, urban warfare, Russia's use of long-range and hypersonic precision missiles, it's artillery dominated grinding nature of land campaign, use of drones by both sides, communications and the use of satellite networks, and the overbearing influence of ISR. The geopolitical fall-out of the war on India needs to be considered carefully. The comprehensive and large-scale sanctions imposed on Russia is already resulting in multi-dimensional impact on rest of the world.

The USA and its allies have pressurised India to not only denounce Russia's military action against Ukraine but to go along with their sanctions by severing India's military armament and energy relationship with Russia. When analysed carefully, we can see that the real objective of their strategy is to severe economic and military-industrial relations of the former Soviet republics to Russia and incorporate them into the western economic system. This has been done successfully in countries like Poland, Czech Republic, Baltic states, Rumania, and now is being attempted in Ukraine. Sanctions is an important tool for this strategy. While the war is on in Europe, India's lucrative defence market has been the primary objective in this strategy ever since 2014 and later when CAATSA was introduced. India has been careful to safeguard its strategic relations with not only Russia but the US and Western Europe as well. The US has gone on record to say that its objective is to wean India away from its reliance for military imports from Russia. The Ukrainian crisis has given a sense of urgency to the USA about its India strategy.

Prime Minister Modi and External Affairs Minister Jaishankar must be complimented for their deft handling of the crisis and navigating India's interests firmly against the pressures from the West. However, the possible problems that these issues would create in the future are substantial. This necessitates India to finetune its strategies for control over critical technologies and recognise the urgency of it. There is no overnight solution in this game. 'Make in India' strategies and support systems must be driven by well-crafted, long-term oriented, and consistent strategies. The fighter aircraft domain is an important area where well-thought decisions are of critical importance to national security. India has strategic partnerships with many countries including the USA, Russia, France, UK, Israel, and Germany. One expects that these strategic partnerships should result in access to critical defence technologies for India. There cannot be a bigger fallacy than this assumption. The leading defence technology countries are fiercely protective of their technology-leadership positions. The reason is that a country's military industrial complex (MIC) provides not only huge economic benefits through market dominance but more importantly the MIC gives these countries enormous power and geopolitical leverage in


Rafale aircraft

the international system. Since India will be a major importer of high-end weapon systems for the foreseeable future, it's defence technology capabilities can be enhanced by strategic leveraging of its defence imports. Successful leveraging will need to factor various methodologies – technology diffusion through manufacturing, joint ventures involving codesign and codevelopment, joint ventures involving license manufacturing for global market, MRO, R & D, and reverse engineering. The most important element, however, is extracting or leveraging a contract in terms of desired technologies, state-of-the-art production, and market access. This will depend on hard negotiations, which again is dependent on economies of scale. This is an area that India has not managed well so far. Invariably our acquisitions have been piecemeal and in smaller lots thereby giving advantage to the vendor in terms of price and a low level of technology access or minimal technology transfer.

India's political leadership has been doing a balancing act with respect to defence modernisation and budget constraints. The defence budget has, while the numbers may show an increase, declined to an all time low of less than 2% of the GDP. More than modernisation itself, the challenge of sustaining minimum operational strength is proving difficult. The IAF's fighter squadron strength is at a low of 32 squadrons as against the authorised strength of 42 squadrons. Navy air arm is deficient of fighter aircraft to operate on the new aircraft carrier. Adversely impacted by the pandemic and the global economic slowdown due to the Ukraine war, the Indian government has announced the curtailment of its long-pending 114 fighter aircraft (MRFA) acquisition for the IAF as also the 57 aircraft requirement projected by the Indian Navy. IAF's 114 aircraft is to be reduced to 57 aircraft while the Navy's requirement is reduced to 26. Both these acquisitions are expected to be done through government-to-government deals. By all indications the French Rafale and the American Boeing's F-18 Super Hornet seem to be the serious contenders.

It is said that the number of aircraft orders are not reduced but being done in two phases. The first part will deal with the process of 'buy global and make in India' while the second part will be orders placed directly on the Indian manufacturer. This plan seems more influenced by domestic politics. The argument that the second phase order will be in Rupees is incorrect as the manufacturer will continue to pay in foreign exchange not only for royalties but for several procurements such as materials, components, and aggregates.

WHILE THE WAR IS ON IN EUROPE, INDIA'S LUCRATIVE DEFENCE MARKET HAS BEEN THE PRIMARY OBJECTIVE IN THIS STRATEGY EVER SINCE 2014 AND LATER WHEN CAATSA WAS INTRODUCED. INDIA HAS BEEN CAREFUL TO SAFEGUARD ITS STRATEGIC RELATIONS WITH NOT ONLY RUSSIA BUT THE US AND WESTERN EUROPE AS WELL

# STRAIGHT DRIVE

Boeing F/A-18E/F Super Hornet

HENCE, IT WOULD MAKE EMINENT SENSE FOR THE GOVERNMENT TO CHOOSE ONE TYPE OF AIRCRAFT FOR BOTH THE IAF AND INDIAN NAVY, WHICH WOULD GIVE A LARGER NUMBER TO MAKE INDIGENOUS MANUFACTURING AN ECONOMICALLY VIABLE AND STRATEGICALLY SUCCESSFUL PROSPECT

India will gain very little in this two-stage process while the foreign country and the vendor will gain immensely. It will also place India in a weak position with respect to negotiations. The procurement costs will be high.

But there are bigger issues to be considered. The fact that the Indian Navy needs a twin-engine fighter aircraft while the IAF is essentially looking to fill the MMRCA gaps should force the decision makers to seek optimal solutions by combining the two. Firstly, if both contenders meet the operational requirements, then selecting a common platform would bring significant savings to the country. Secondly, if order sizes are small, translating into local manufacture becomes problematic in many ways. The original MMRCA case was for 126 aircraft with a provision of 18 aircraft as off-the shelf buy and 108 aircraft to be manufactured within the country. This was an optimal number that would have enabled the necessary time and investment to set up production infrastructure, enough to start from assembly to the final phase of production from raw materials. Such a sequence allows for technology absorption, skill development, and enable indigenisation of various components. It also allows for the Indian side to negotiate better prices and leverage to our advantage. We scrapped this plan and instead went in for direct purchase of 36 aircraft. While the IAF is highly satisfied with the aircraft in terms of operational performance one must examine the larger issues. The two squadrons are based in two different bases with the technical and maintenance infrastructure investment for each base, which at the minimum is sufficient for accommodating two to three squadrons in each base. Besides, as these aircraft were off-the shelf buys, India did not gain by way of technology transfer or creation of any state-of-the-art production facilities. Instead, since the numbers were small the procurement was bound to be expensive. While interacting with the French industry, Dassault made it clear that setting up production facility was unviable if the orders were in two or three batches of 36 to 50 aircraft as a break in production run was unacceptable. What was implied was that a guaranteed production run of 100 aircraft was necessary for economic viability of the manufacturing program.

The naval procurement of 26 or 57 aircraft does not make indigenous production an economic viability. Similarly, the IAF's requirement, if made in two phases of separate orders or procurements, will make manufacturing in the country economically unviable. Hence, it would make eminent sense for the government to choose one type of aircraft for both the IAF and the Indian Navy, which would give a larger number to make indigenous manufacturing an economically viable and strategically successful prospect. It will enable the government to drive a hard bargain, leverage access to critical technologies and derive the technology transfer on our terms. Additionally, the selected vendor could become a critically accountable support agency to the AMCA program. India's acquisition process has a track-record of enormous delays, indecisiveness, and the country losing out big time due to short-sighted piecemeal procurements. Correct lessons must be derived and applied if India is to become truly a globally competitive defence manufacturer and achieve control over critical technologies.

*–The writer is a former Deputy Chief of Integrated Defence Staff for Policy, Plans, & Force Development (DCIDS – PP & FD). He is currently the President of The Peninsula Foundation, a Chennai-based public policy research think tank. The views expressed are personal and do not necessarily reflect the views of* ***Raksha Anirveda***

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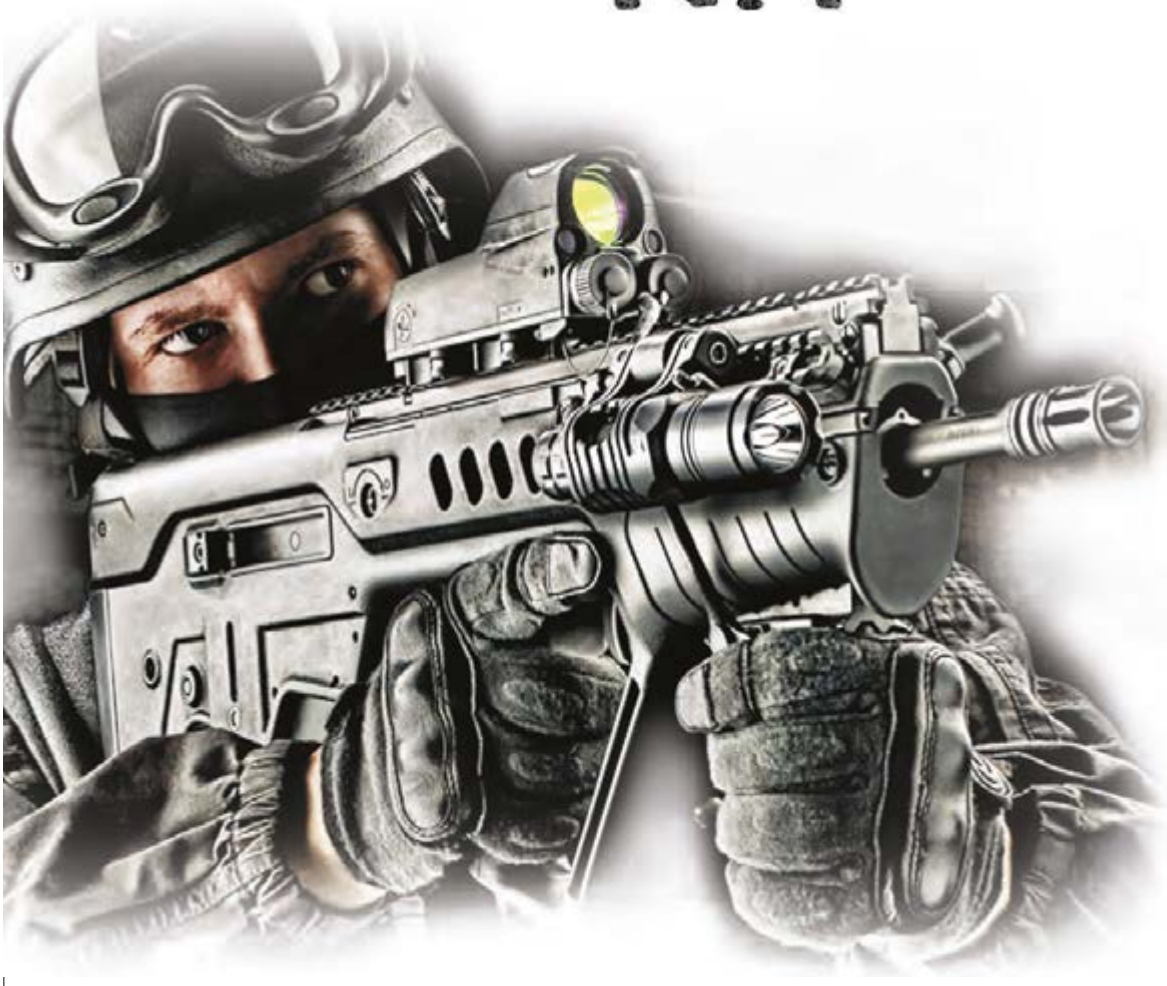

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OPINION

# RISING TO THE NEW FRONTIER

As China is systematically expanding its counterspace capability, with other countries following suit, the time has come for India to start planning for establishment of a separate vertical in its military establishment called Indian Space Force (ISF)

ASAT China Missile

By **DR AJEY LELE**

For last couple of years, India is witnessing a push given to the process of defence reforms in the country. These reforms are found happening at the multiple levels. Actually, there is a long history of defence reforms in the country. Post-1999 Kargil war, the Kargil Review Committee (KRC) was set up with a main focus towards examining the overall national security system in the country.

Over the years, various changes in the military structures and polices have been caried out based on the Kargil committee and few other committee reports. Appointment of first Chief of Defence Staff (CDS) on December 30, 2019 could be viewed as a major reform undertaken in recent times. Subsequently, there has been a major push for indigenisation with an announcement of a big defence items for which there is an import embargo. Also, there is an increasing focus on promotion of export of Indian defence products. The recent announcement of Agnipath recruitment scheme for the induction of the soldiers could be viewed as a next step in the reforms process.

In order to continue with the process of changes in the military organisation, there was a demand from the armed forces for the entablement of three different commands for special forces and for conduct of space and cyber activities. During November 2019, this demand was met by establishing three tri-service agencies. This step could be viewed as a major reform, in regard to deciding on the military cyber and military space policies of the country. As a first step, the government has established agencies which are headed by two-star officers. However, this process has to be dynamic and much more is required to be done, particularly in the space domain to address the emerging challenges.

The 1991 Gulf War gets viewed as the first satellite war where satellite technologies were used for assisting the allied force in the conduct of war for the purposes of commutations, navigation and for collection of intelligence inputs and weather information. This war actually showcased the relevance of space technologies in the warfare. At present, many countries are found investing in this sector. At the same time, during last few years, the expanse of the idea of using satellite technologies in the warfare has evolved in a different direction too. Presently, apart from using satellite technology as a 'force multiplier' for military needs, there is also an angle of 'space warfare' becoming increasingly apparent. China's conduct of Anti-satellite Test (ASAT) during 2007 could be viewed as a 'seed' of such a change in thinking.

By conduct of ASAT test, China demonstrated to the rest of the world (read US and India) that, if need arises then they can disable the military satellite systems of their advisories. This one reckless action by China has made their adversaries to recalibrate their military and space policies. The US, immediately responded by conducting an ASAT test during 2008. This Operation Burnt Frost, conducted by the US was a military operation to intercept and destroy their non-functioning satellite USA-193. Subsequently, the US has established a separate military space service (one of the eight uniformed services) called the US Space Force during December 2019. Currently, this world's only independent space force is found undergoing massive expansion. The US is also fully aware about the possible threat posed by Russia (they have conducted an ASAT test on 15 November 2021) in the space domain.

It is important to note that post-2007 ASAT test, China is systematically investing into expanding its counterspace capability matrix. It is but obvious that China is not keen to allow the US to have any asymmetric advantage in the domain of space. China is keen to ensure that, in case of any military tensions in the Asia Pacific region, the US should not be in a position to dictate the terms in space. They have already established (and tested) a capability to jam the US satellites, if they try to pick-up any information over Taiwan, Hong Kong region. Post-2007 ASAT China has conducted various other tests to check the feasibility of expanding their ASAT programme in low, medium and even geostationary orbits.

China has made important investments towards developing various kinetic and non-kinetic options to challenge the adversary's assets in the space. Beyond kinetic-kill space weapons (KKV), they are known to possess cyber and laser satellite jamming technologies and other weaponries like directed energy weapons (DEW).

China has also made commendable progress in the civilian (dual-use) domain of space. They possess important satellite systems meant for commutations and navigational purposes. Their earth-observation/remote sensing satellite systems (spy satellites) have much use for intelligence gathering too. Presently, they are giving final touches towards fully operationalising their space station. Also, their Moon and Mars programme have made much progress in short time. This development of expertise in the so-called non-military domain of space allows China to quickly reconfigure the technologies for military means, if requirement arises.

China has made rapid progress in the field of science and technology during last few decades. There is a big question mark in minds of many strategic thinkers with regard to China's capabilities, investments and intentions in the domain of space. China's space programme is known to be an important part of PLA's strategic mandate. Obviously, to address a threat of this nature and for creating own space deterrence mechanism, the US has gone ahead and established a separate military space vertical.

Over the years, India has made significant investment in the space domain. Also, Indian armed forces are getting assistance from satellite technologies. On 27 March 2019, India successfully conducted an ASAT test. Obviously, one of the most important reasons for the conduct of this test was sending across a message to China. By conducting this test, India has now defined its strategic stance in the space domain and has elevated its own 'space envelope'. Now, it is important for India to evolve its strategic vision in space domain analytically. Looking at the existing and futuristic military challenges in the domain of space now the time has come for India to start planning for establishment of separate vertical in its military establishment called Indian Space Force (ISF). As and when (and if) such defence reform happens, then it is expected to be viewed as 'mother of all defence reforms in India'!

*- The writer is a Consultant with MP-IDSA, New Delhi. The views expressed are of the writer and do not necessarily reflect the views of* ***Raksha Anirveda***

THE 1991 GULF WAR GETS VIEWED AS THE FIRST SATELLITE WAR WHERE SATELLITE TECHNOLOGIES WERE USED FOR ASSISTING THE ALLIED FORCE IN THE CONDUCT OF WAR FOR THE PURPOSES OF COMMU-TATIONS, NAVIGATION AND FOR COLLECTION OF INTELLIGENCE INPUTS AND WEATHER INFORMATION

ANALYSIS


INS Vikrant

# INDIAN NAVY: FROM BUYER TO BUILDER

After contributing significantly to India's victory in the 1971 War, Indian Navy has successfully built over 80 warships and two nuclear submarines and looks to commission its first Indigenous Aircraft Carrier, the 40,000 tonne INS Vikrant with MiG-29K fighters on August 15 this year

By **CMDE RANJIT B RAI**

The Indian Navy is called the "*Silent Service*", as the Navy's three-dimensional 115 warships, 19 submarines including 2 nuclear submarines and over 200 aircraft, helicopters and drones operate at sea away from the glare of the media and show India's Flag and exercise abroad with leading Navies. The Ministry of External Affairs (MEA) has set up a maritime division as a force multiplier for India's diplomatic and humanitarian efforts and domain knowledge of naval officers. A Maritime Security Adviser (MSA) Vice Admiral G Ashok Kumar (retd) has been appointed under the National Security Adviser (NSA) Ajit Kumar Doval to coordinate the Multi-Agency Security Group that held its first meeting on June 30, 2022.

Indian Navy's pedigree is from the Royal Navy (RN) which Admiral Lord Louis Mountbatten lauded for its actions in World War II. Sir Winston Churchill, Britain's Prime Minister during the World War II, who won the Nobel Prize in Literature, famously wrote, "*War History is written by the winners*". But the Royal Indian Navy's actions were not included in the naval history despite the heroic actions of the Royal Indian Navy (RIN) officers and ratings in the Red Sea, the Burmese Arakan coast and the Indian Ocean with their strength going from 3,500 to 30,000 and 30 ships between 1939 and 1942.

This void was filled by efforts of late Admirals Manohar Awati and JG Nadkarni and the Maritime History Society of Bombay. Cmde Johnson Oddakal and this writer chronicled war actions of Admiral Ramdas Katari (first Indian Chief of Naval Staff), CNS Admiral BS Soman, SG Karmarkar MBE, N Krishnan, Distinguished Service Cross (DSC) Daya Shankar, DSC, AK Chatterji and others mainly from TS Dufferin, accessing records in the RN Greenwich Library in London. Cmde Oddakal's book '*Timeless Wake*' records the legacy of the RIN in World War II and all such officers who were the stewards who charted India's Navy from 1947 as the senior service till January 26, 1950 when the Navy was cut to size. Those that stayed brought back 16 warships from UK between 1948 to 1960 which included 7,500 tonne large

cruisers INS Delhi (1948), Mysore (1957) and 15,000 tonne aircraft carrier INS Vikrant (1961). They spent months in British shipyards and vowed to make Indian Navy a builder's Navy. They deserve a salute as India celebrates 75 years away from the yoke of British rule which left India a poor nation. Further details can be found in the writer's novel, '*An Underhand Affair*' (ISBN 7893 88644 167).

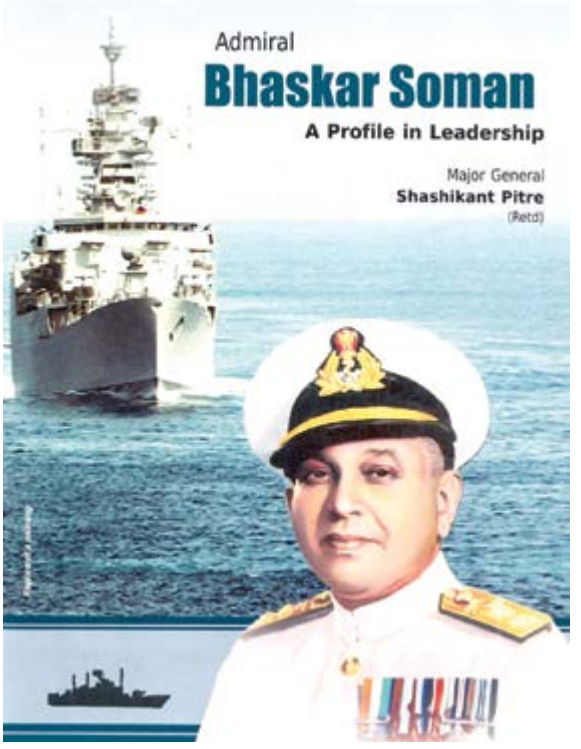
In the 1965 War, the Government lacking expertise to employ the Navy, ordered it not to venture above the latitude of Porbunder, despite protestations by Admiral BS Soman. The spotlight only shines on the Indian Navy on Navy Day for a week from December 4 every year, when it commemorates the day in 1971 when the Osa class missile boats struck Karachi in Operation Trident with their long range Rangout radars and Styx missiles, and sank three Pakistani ships off Karachi, and in Operation Python five days later Navy struck Kemari oil tanks. The Navy's actions have gone down in the annals of Naval Warfare as a Revolution in Military Affairs (RMA). The Navy played a supporting role in hastening the Pakistani surrender in the East in 14 days to establish Bangladesh with the naval Mukhti Bahini. The naval brass doubled efforts and made it a Builder's Navy by 1990. In the 1999 Kargil half war, the Navy laid a blockade around Pakistan called the Naval Manoeuvre in Operation Talwar to support the Army which hastened Pakistan's withdrawal. In the 2004 Tsunami, Navy's prompt humanitarian actions, faster than the US Navy, to help neighouring countries were highlighted by the world media.

The waters of the Indian Ocean wash the shores of 40 nations and oceans have always held importance. India's maritime geography and its Navy are India's assets in the 21st Century.

**Admiral Krishnan showing President VV Giri the clock recovered from the PNS Ghazi sunk just outside Visakhapatnam harbor on the first day of the 17 day 1971 war with Pakistan that resulted in the liberation of Bangladesh. The clock has stopped a few minutes past midnight, the exact moment the Ghazi exploded and sank**

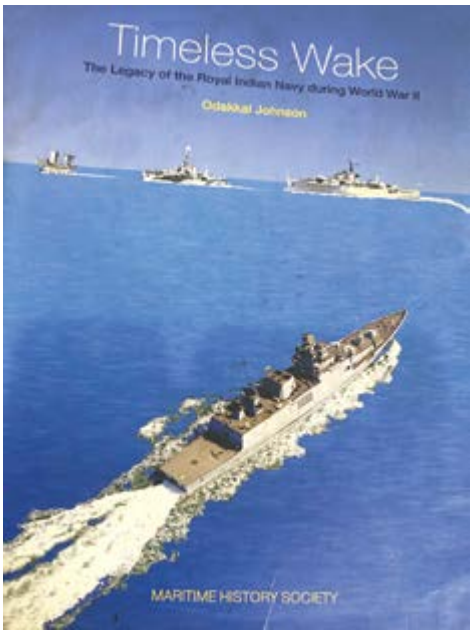
The Indian Ocean occupies a vital place in India's national security and India's economic prosperity and this has been articulated and acted on by Prime Minister Narendra Modi with the initiatives of Security And Growth for All in the Region (SAGAR), Mausam and Sagarmala.

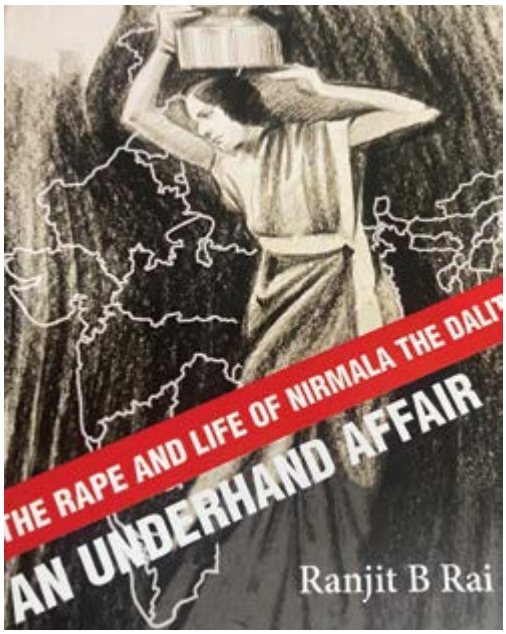
The Navy's emphasis has been on training and technology, and has ensured it keeps up with innovation which can be only listed in pages. All executive officers are now Bachelors of Engineering (BE), which is paying dividends to make the Navy adopt indigenous technology, even though its budgets are the lowest among the services. Indian Navy's planners have now built over 80 warships in India, which signify its increasing strides towards *Aatmanirharata* (self-reliance). Quite early the Navy energised its Naval Ship and Submarine Design Bureau (DGND) and also set up a classified R&D group called the Weapons Electronics Engineering




Systems Establishment (WEESE) to support naval designers with modern software, upgrades in refits of ships and secure communication systems. WEESE also designed modems for

# ANALYSIS




**THE INDIAN OCEAN OCCUPIES A VITAL PLACE IN INDIA'S NATIONAL SECURITY AND ECONOMIC PROSPERITY. THIS HAS BEEN ARTICULATED AND ACTED ON BY PRIME MINISTER NARENDRA MODI WITH THE INITIATIVES OF SECURITY AND GROWTH FOR ALL IN THE REGION (SAGAR), MAUSAM AND SAGARMALA**

space, voice and digital data connectivity with ISRO's GSAT-7 Rukmini programmes, supported cyber security and designed indigenous command and control systems on ships saving millions in foreign exchange. Only few main propulsion engines and advanced radars, helicopters and a few weapon systems are imported now.

Not being a signatory to Nuclear Non-Proliferation Treaty (NPT), the Government realised the need for nuclear submarines and set up the classified DRDO Advanced Technology Vessel (ATV) Project. It was promoted by late Dr Raja Ramana, Chairman, Department of Atomic Energy (DAE) and Dr V S Arunachalam, Secretary, Defence Research and Development Organisation (DRDO) with funding and support from the Prime Minister's Office (PMO), under a Naval Admiral. India's Bhabha Atomic Research Centre (BARC) Mumbai trained Naval officers and designed a miniature uranium reactor and constructed a shore training half submarine with a shaft, gear box and a propeller at Kalpakam at the Indira Gandhi Atomic Research Centre (IGARC). Anil Anand, a French-trained reactor scientist and late Dr Sekhar Basu who went on to serve as the Chairman of the DAE, commissioned the training reactor (S1) along with selected naval officers on September 22, 2006. It was a strategic game changer for India's nuclear deterrence.

The ATV steering committee selected and acquired the Spasskiy 6,500 tonne 83mw single reactor design from Rubin Consultancy along with intellectual property rights (IPRs) called Normatives (limits) to modify the design within parameters. The Navy with hindsight of building Leanders and improving on them at Mazagon Docks, seeing the slow progress of *ab initio* designing of the naval LCA, pushed hard for the purchase of the design and Russian consultancy for safety in this new technology.

For construction of Arihant (S2), the Navy pressed on a public-private partnership model (PPP) with the ATV Board headed by a Naval Admiral and argued that a Public Private Partnership (PPP) model would enable participation of India's private sector and MSMEs (micro, small and medium enterprises) and high-technology laboratories to build sub-assemblies to drawings and digital control systems. Larsen & Toubro Ltd (L&T) which had a heavy engineering facility and experience in building nuclear plants at Hazira was selected. The Navy leased a dry dock and a jetty to L&T at the Naval Dockyard at Visakhapatnam and with the help of DRDO, set up a Ship Building Centre (SBC) and workshops to construct nuclear submarines on Soviet lines. Currently, a new base Varsha is coming up South of Visakhapatnam at Rombili with facilities set up by BARC for nuclear support.

INS Arihant and Arighat were assembled in modular blocks under with precision welding. Russia provided critical parts to BARC and other agencies for miniaturising the nuclear reactor. Arihant's hybrid reactor was fired for criticality by BARC's Dr Usha Paul, later decorated for designing the safe shutdown of the reactor in emergency (SCRAM). It was commissioned in November 2016 without any fanfare. The commissioning date of Arighat has not been publically announced.

The Navy adheres to a Maritime Capability Perspective Plan (MCPP), and has built world class 500 km anti-ship cum surface BRAHMOS, and 60 km Barak AA missiles and fitted them on ships. It has fitted the underwater 650 km K-15/BO-05 nuclear capable

missiles in Arihant. The nuclear capable 3000 km K-4 has been tested from an underwater launcher. The latest indigenous ships inducted into include the three Type 15A Kochi class destroyers, one Type 15B INS Visakhapatnam, three Type 17 Shivalik class frigates, four of six Scorpene submarines and three P28 Kamorta class Corvettes with 90% Indian content and a host of smaller platforms. All Navy's airborne, surface and sub-surface platforms are networked over a common data link using multiple means of communication including Rukmini.

The Navy is supported by a 17,000-strong Coast Guard with over 35 large platforms and is responsible for law enforcement and coastal and maritime patrol. It is the guardians of India's coastline of 7516. 6 km (4,671 miles) and increasing 2.4 mill sq km of Economic Exclusive Zone (EEZ) to maintain peace and stability for flourishing of trade and India's Blue economy. The Navy ships and its 12 P-8I 737 MR aircraft scour the seas for Maritime Domain Awareness (MDA) and deterrence and feed MDA into a world class fusion fed Information Management and Analysis Centre (IMAC). The future plans for 39 ships is in various stages of building.

As India celebrates 75 years the Navy has many credits for the nation to laud as it looks to commission its own home-built aircraft carrier 40,000 tonne INS Vikrant with MiG-29K fighters on August 15, which will be a great achievement. Only six nations can build aircraft carriers. The commissioning of Arighat may be also announced with greater capability. *Sham No Varunaḥ!*

## MORE RIN SHIPS JOIN THE MELEE

- **Lt SG Karmakar has the distinction of being the first Indian Officer to Command a ship of the Royal Indian Navy and he later attained the Flag Rank**
- **Lt HMS Choudri became the first Flag Officer to command the Pakistan Navy**

*–The writer is an Indian Navy veteran, former DNO and DNI. He writes and broadcasts on military affairs and is Curator of New Delhi's only Maritime Museum at C 443 Defence Colony with free entry to bring about Sea Mindedness. The views expressed are personal and do not necessarily reflect the views of* ***Raksha Anirveda***

DIPLOMACY

# INDO-ISRAEL DEFENCE COOPERATION: AN INSIGHT INTO THE FUTURE ROADMAP

India and Israel are celebrating their 30 years of diplomatic ties. India-Israel ties have grown by leaps and bounds. Israel being a defence superpower, especially in cyberspace, the bilateral ties between India and Israel are strategically important. India and Israel can collaborate in the space sector and there is a need to identify mutually-beneficial technologies to create a sustainable path for collaboration

By **PRANAY K SHOME**

Three decades could be a short time for human life, but in international relations and military science, it is like ages. This is all the more evident in the relationship between India and Israel as the two countries are celebrating their 30th year of establishment of diplomatic ties. India and Israel are examples of being bound by civilisation, trade, commerce and more importantly people to people ties. Both countries are also bound by common threats of combating terrorism, separatism and the need to keep external and internal borders safe from foes inside as well as outside.

While India-Israel ties have grown by leaps and bounds, it is necessary to understand the various dimensions of the flourishing bilateral ties. One very dynamic sector, which has seen a proliferation in the last three decades, is the defence sector.

The defence sector globally has seen a colossal growth ever since the time of the cold war. The end of the cold war and the emergence of new ideas and modes of threats have seen nation-states around the world bolster their defence spending. In this context, India and Israel are no different. Israel was formed in 1948 by the United Nations by dividing Palestine. Since then, the Jewish nation-state has been surrounded by countries that have been historically antagonists to the Jewish state, and have vowed to annihilate Israel. But after the 1947-48 Arab-Israel war, Israel has grown in strength. One of the cornerstones of this power has been the vibrant defence sector of the country.

ISRAEL IS THE THIRD LARGEST MILITARY EQUIPMENT EXPORTER TO INDIA. OVER THE YEARS, ISRAEL HAS EXPORTED DEFENCE GOODS TO INDIA TO THE TUNE OF $2.9 BILLION. THE MAIN PURCHASES INCLUDED MISSILES, RADARS AND UAVS

Israel is undoubtedly a defence superpower. The Israeli armed forces have spent over $6 billion on the procurement of defence goods, which includes several state-of-the-art weapons systems such as drones and Lethal Autonomous weapon systems. It is the only country in the Middle East that boasts of a sufficiently strong nuclear arsenal. Further, Israel is a cyber superpower. It has demonstrated its capability several times to defend the sovereignty of the country in cyberspace. The focus of this article is to provide insights into the future roadmap this defence relationship will be embarking on.

## DEPTH OF DEFENCE PARTNERSHIP

It is necessary to understand the depth of Indo-Israel defence cooperation. Israel is the third largest military equipment exporter to India. Over the years, Israel has exported defence goods to India to the tune of $2.9 billion. The main purchases included missiles, radars and UAVs. The Indian armed forces rely heavily on Israeli Searcher and Heron UAVs to meet their surveillance requirements with a growing need for more. In the backdrop of the standoff with China in eastern Ladakh last year, the Indian military leased four heron medium altitude surveillance drones from the Israel Aircraft Industries, which have since been inducted.

PM Narendra Modi wtih Israeli Defence Minister Benny Gantz

In the second half of last year, the Indian military also placed orders for smaller, yet potentially lethal, 'Sky Striker drones to be manufactured in Bengaluru by a joint venture between Israel's Elbit System and India's Alpha Design Technologies, which is now part of Adani Group.

## THE FUTURE ROADMAP

Having stated the depth of the Indo-Israel defence partnership, it is now necessary to understand the future roadmap of this defence relationship. One of the key areas where India and Israel can collaborate is the cyberspace sector. India is an IT superpower. It is also ranked third in the world on the Hurun start-up rankings in terms of new and innovative start-ups. Israel is slowly coming up as a new potent country. The focus of cyberspace can be on extending cooperation in protecting and preserving vital infrastructures such as power grids, power plants, and critical military installations such as nuclear assets, including missiles and reactors. Another key area of this cyberspace cooperation is to ensure protection against threats from external actors, both state and non-state actors. In the recent past, India has faced cyberspace threats from Chinese hackers who were responsible for hacking into the grid system of Mumbai causing a power outage in the financial capital of India and making nefarious hacking attempts in other parts of India as well in various other sectors. Israel can with its solid defensive cyberspace capabilities provide help to India to bolster the protection of its critical assets.

Another key area is the realm of artificial intelligence. AI is the new buzzword in the area of defence and military intelligence. Countries such as the USA, Russia and Israel are making increasing use of these AI-based weapons. One such example is the T-14 Armata Main Battle Tank of Russia. The manifestation of this Artificial Intelligence-based weapon is the Lethal Autonomous Weapons Systems (LAWS), which include the autonomous Unmanned Aerial Vehicles, not the ones used only for surveillance but the ones that contain weapons - the 'hunter killer' ones, which will be unmanned in the future. Israel is again a leader in such types of weapons. Israel made use of a modern automatic sniper rifle remotely controlled to assassinate top Iranian nuclear scientist Mohsin Fakhrizadeh this year.

While this may appear to be a source of potential discomfiture for the dovish people yet from the security point of view, it is a new excellent source of

THE INDIAN ARMED FORCES RELY HEAVILY ON ISRAELI SEARCHER AND HERON UAVs TO MEET THEIR SURVEILLANCE REQUIREMENTS

# DIPLOMACY

Israeli Defence Minister Benny Gantz with Defence Minister Rajnath Singh

SPACE IS AN IMPORTANT AREA WHERE INDIA AND ISRAEL CAN COLLABORATE. INDIA IS A GREAT SPACE POWER AND IS ONLY THE FOURTH COUNTRY IN THE WORLD TO HAVE THE ABILITY TO DESTROY SATELLITES. THE FUTURE DEFENCE COOPERATION COULD BE TO STRENGTHEN INDO-ISRAEL SPACE DEFENCE AND OFFENCE TECHNOLOGIES

futuristic defence cooperation between Israel and India. India has been plagued by terrorism emanating from Pakistani soil for decades and such weapons meant strictly for the self-defence of the country are absolutely essential for defending the sovereignty of the country. Therefore, the Defence Acquisition Council (DAC) and the Cabinet Committee on Security (CCS) should positively consider working in these areas to bolster the future of this vibrant relationship.

## THE JOINT WORKING GROUP

Another sign of the deepening cooperation of both the countries is a recent new development - the establishment of a task force that will work to identify new areas of defence cooperation. The Joint Working Group will chalk out a new strategic vision for intensifying defence cooperation between India and Israel in the long term period.

To realise the true potential of this partnership, what is needed now is the identification of mutually-beneficial technologies and greater engagement between their respective innovation ecosystems. This will create a sustainable path for collaboration between the two tech-savvy democracies. Promoting start-ups in the defence sector around technologies such as AI-based weapons, the offensive as well as defensive cyberspace capabilities are essential.

Space is another area where India and Israel can collaborate. India is a great space power and is only the fourth country in the world to have the ability to destroy satellites. The future defence cooperation could be to strengthen Indo-Israel space defence and offence technologies.

## CONCLUSION

India and Israel are on the verge of making history. The ongoing war in Ukraine has highlighted the need for India to become self-reliant. However, self-reliance should mean promoting synergy in defence ties and not inward-looking defence development.

*– The writer is currently working as a Research Associate at Defence Research and Studies (dras.in) and is a columnist. The views expressed are personal and do not necessarily reflect the views of* ***Raksha Anirveda***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DIPLOMACY

# 30 YEARS OF INDO-ISRAEL DIPLOMATIC RELATIONS

Ever since the establishment of full diplomatic relations in 1992, the defence partnership between the two countries has continuously gained momentum and strength. The future growth trajectory of defence cooperation between India-Israel looks promising

By **NINA SLAMA**

On January 29, 2022, India and Israel celebrated 30 years of diplomatic relations. Both countries today have strategic relations in a wide range of sectors such as defence, agriculture and trade which started three decades ago. Since its inception in 1948, the Jewish state wanted to have full diplomatic relations with India. However, Indian Prime Minister Jawaharlal Nehru (1947-1964) adopted a pro-Arab policy because of domestic, and international compulsions. Nevertheless, Israel was always ready to assist India in times of need.

Israel shared intelligence and provided weapons to India during its war against China in 1962 and its wars against Pakistan in 1965 and 1971. Following the establishment of the Research and Analysis Wing (RAW) in 1968, PM Indira Gandhi (1966-1977) allowed R. N. Rao, to develop secret relations with the Israeli Mossad which operated as an alternate diplomatic service of the Israeli foreign ministry and maintained relations with intelligence agencies of countries that did not have diplomatic relations with Israel. The Mossad was able to overcome the political and economic restrictions that India imposed on Israel by offering military, medical and agriculture assistance through secret and informal channels.


**Prime Minister Narendra Modi with former Israeli Prime Minister Benjamin Netanyahu**

In the late 70s when the Janata Party came to power after defeating the Congress party, Israel hoped that Prime Minister Morarji Desai and his Minister of External Affairs (MEA) Atal Bihari Vajpayee would change their policy towards the Jewish state. However, the Minister for External Affairs Vajpayee was not willing to upset the relations with Arab and Muslim states in West Asia and continued to maintain an anti-Israeli approach. However, India continued to officially promote a pro-Arab policy while maintaining back-door relations with Israel through secret channels. In August 1977, Israel MEA Moshe Dayan secretly visited India and met PM Desai. The Indian PM's office and Intelligence agency organised the meeting without involving India's foreign ministry. The objective of the meeting was to normalize the relations between the two countries. Before Dayan's visit to India, PM Desai and Israeli Defence Minister Ezer Weizman secretly met in the United Kingdom. The

purpose of this meeting was to sell Israeli technologies to India. In June 1979, Desai's principal secretary V. Shankar paid an official visit to Israel to procure weapons and ammunition via Cyprus.

During her second term in power, Indira Gandhi (1980-1984) continued to promote a pro-Arab policy and condemned Israel for destroying the Iraqi nuclear facility Osirak in 1981 and invading Lebanon in 1982. Israeli Consul in Mumbai Yossef Hassin criticized India's approach toward the Jewish state. India reacted to this by expelling the Israeli Consul and severing its relations with Israel in 1982. However, PM Indira Gandhi allowed the Indian intelligence agencies to consult Israel on security and intelligence matters.

Meanwhile, Rajiv Gandhi (1984-1989) who came to power after Indira Gandhi's assassination in 1984 had a different approach to politics and foreign policy. He was not tied to the traditional policy of the INC or afraid to engage with countries like the United States (USA), China and Israel that did not have good relations with India. In September 1985, he met Israeli PM Shimon Peres at the United Nations (UN). This was the first time that the PMs of both countries met. However, in spite of his willingness to improve the relations between the countries, Rajiv Gandhi wasn't able to do much because of domestic pulls and pressures.

Finally, when P. V. Narasimha Rao became Prime Minister after Rajiv Gandhi's assassination in 1991, there was significant thawing of relations between the two countries. Eventually, India and Israel resumed full diplomatic relations on January 29, 1992. But despite the willingness among the top leaders to renew the old ties and move forward, PM Narasimha Rao was compelled to adopt a more cautious approach towards Israel because many Indian politicians were not fully in favour of enhanced defence cooperation with Israel. Hence, both countries mainly signed agreements in the fields of economy, science, culture, and tourism. Though many Israeli defence and security companies wanted to engage with India, there were quite a few obstacles in the path which prevented both countries to develop defence cooperation.

**Defence Minister Rajnath Singh with Israeli Defence Minister Benny Gantz**

Finally when the Bharatiya Janata Party (BJP) came to power with Atal Bihari Vajpayee as PM defence cooperation between the two countries expanded significantly. Vajpayee believed India should conduct a more pragmatic policy to promote its national interest. He perceived Israel to be an important military partner to modernize the Indian army and share intelligence to fight terrorism and radical Islam. India decided to procure light ammunition and upgrade the combat electronic systems of its INS Virat.

In May 1998, when India conducted nuclear tests and the US imposed sanctions forbidding other countries from selling military equipment and technologies to India, Israel stood by India. Israel was perhaps the only country that did not condemn India for conducting the nuclear tests or imposed an embargo on India. Rather an Israeli delegation visited India to sell electronic equipment for Indian warplanes.

In May 1999, when the Kargil War erupted following the Pakistani infiltration in Jammu and Kashmir, Israel proved to be a reliable partner and provided India with the necessary military equipment to address the security threat and expel the Pakistani forces from its soil. Since that day, many analysts believe India should expand its relations with Israel for border security purposes.

Despite speculations to the contrary, Manmohan Singh who succeeded Atal Bihari Vajpayee as PM (2004-2014) did not cancel any military agreement signed during Vajpayee's tenure and extended the military relations by acquiring Phalcon systems and Surface to Air Missiles (SAM).

Likewise, Narendra Modi wanted to expand the relations between both countries to a strategic level and promote the 'Make in India' initiative to increase the development of the industrial sector in India. Israeli PM Benjamin Netanyahu was in favour of this policy, as he believed it will diversify Israel's manufacturing opportunities.

Israel today is India's second-largest defence supplier after Russia. Both countries extended their defence relations not only on the bilateral level but also on the multilateral level together with the US and Gulf countries, following the signing of the Abraham Accords in August 2020. In June 2022, Israeli Defence Minister Benny Gantz paid an official visit to India. During his visit, both countries signed agreements which will expand the collaboration and development of futuristic defence technologies. Different regional and international dynamics will lead both countries to extend their defence cooperation on the bilateral and multilateral levels.

*– The writer is a Guest Lecturer and Teaching Assistant at Reichman University (IDC Herzliya), specializing in India-Israel relations. The views expressed are personal and do not necessarily reflect the views of* ***Raksha Anirveda***

TECHNOLOGY

# A PERSPECTIVE ON NEUROMORPHIC COMPUTING

In today's digital world, the amount of data is growing at an alarming rate. The computational techniques such as Artificial Intelligence, Machine Learning and Deep-Learning have proved to be useful in this regard but they come with some inherent trade-offs. Hence, to deal with such a situation, scientists are now trying to find a solution in the working of human brain

By **MANAN SURI**

The amount of data and information around us is continuously growing with each passing second. The estimates indicate that the total volume of information generated every year would reach the order of zeta bytes! (1 zeta byte = $10^{21}$ bytes, yes 21 zeroes!). Such a gigantic increase in the volume of data is happening due to multiple reasons: First, the increasing digitisation of our surroundings and our very own existence (from biometrics as identity we are fast moving towards virtual worlds and metaverses!). Secondly, domains such as defence, security and climate change require continuous 24x7x365 streams of data to be acquired, analysed, and monitored for extracting useful operational insights. Thirdly, consistent miniaturisation and advances in the domain of electronics (semiconductors) over the last few decades have made the procedures of data generation, acquisition and storage cheaper than ever before.

This humongous amount of raw data by itself is of little value unless meaningful insights and patterns are not extracted in an efficient and time-bound manner. On this front, we are witnessing the explosion of emerging computational techniques such as Artificial Intelligence, Machine Learning, and Deep-Learning. While advanced AI techniques such as deep learning have proved to be useful for applications, including computer vision and NLP, they come with some inherent trade-offs: First, requirement of a huge amount of human supervision for training (ex - datasets with 18 million annotated images and 11,000 categories). And second, unsustainable energy dissipation during the development phase – (According to one study, training of the powerful language model GPT-3 led to 552 tonnes of carbon dioxide emission. Such emission is equivalent to that of 120 cars driven over an entire year).

## FINDING CLUES IN HUMAN BRAIN

To overcome some of the aforementioned limitations, researchers have turned towards mother nature, finding

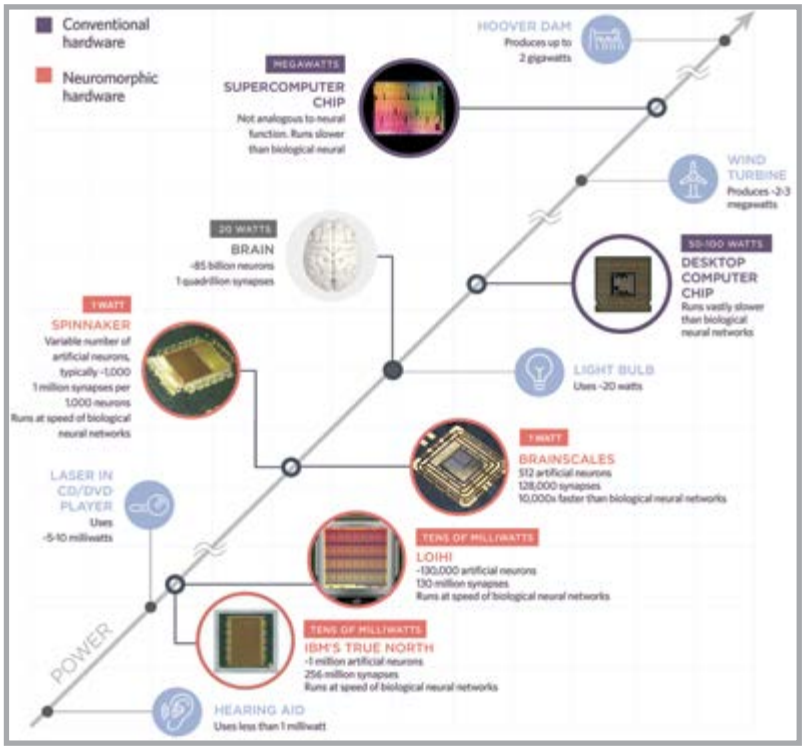


**Figure 1 Power dissipation of neuromorphic and conventional hardware with respect to the human brain (Source: S. Ravindran, "Infographic: Brain-like computers provide more computer power."). Note the power consumed by state-of-the-art supercomputing chips is orders of magnitude higher than neuromorphic computing chips.**

clues in the way human (or mammal) brains function and process information. The human brain is a computational marvel! It is estimated to consume ~ 20 watts of power to perform extremely advanced intelligent actions that no supercomputer in the world can beat even after dissipating gigawatts of power. The latest generation of energy-efficient neural networks inspired by the working of human brains is known as spiking neural networks (SNNs). The field of science and engineering that deals with the design and development of SNNs is known as Neuromorphic Computing. Neuromorphic computing is a highly interdisciplinary topic lying at the intersection of – computer science, computer architecture, computational neuroscience, semiconductors and Artificial Intelligence.

In the brain, neurons are the cells that are responsible for processing and transmitting information, generally communicating through the language of spikes. The connection between two neurons is called a synapse. The flexibility of the synapses as a conducting medium for inter-neuron communication is a critical underlying factor enabling the extreme learning capabilities of the brain. It is in fact the strength of synapses that defines the form and structure of a neural network in nature. In the domain of neuromorphic computing, hardware designers and computer scientists take broad inspiration from the findings of computational neuroscience, and observations of neurobiologists and try to build artificial brains in silicon. While biological brains are extremely complex and not fully understood, neuromorphic designs or artificial brains are at best highly simplified efficient computational systems for specific applications.


**Figure 2 Industry landscape in the domain of Neuromorphic Computing. Source: Yole 2019**

The neuromorphic computing market is expected to reach $ 550 million by 2026, with a CAGR of 89.1%. Major defence R&D and aerospace bodies have been actively investing towards the goal of building cutting-edge neuromorphic computing hardware/software and sensors. Some notable mentions include – DARPA's $ 100 million grant for the SYNAPSE project in 2008, with the aim to build a brain-scale neuromorphic processor. The US Air Force Research Laboratory (AFRL), in partnership with IBM, claimed to build the world's largest neuromorphic processor Blue Raven to explore various defence/aerospace applications. DARPA's 2021 initiative to support neuromorphic learning algorithms for event-based infrared (IR) sensors for defence applications. Australian government's Moon to Mars initiative supported applications of neuromorphic vision sensors for complex in-orbit processes such as spacecraft docking, refuelling and payload transfer or replacement.

## NEUROMORPHIC COMPUTING CHIPS

The dual-use potential of neuromorphic computing can be gauged by the fact that several major tech-industry players/ governments have directly or indirectly invested in the domain. Companies such as IBM, Intel and Brainchip have developed low-power neuromorphic computing chips that can solve computational problems at a fraction of the energy compared to mainstream processors. Several companies and startups are also developing bio-inspired neuromorphic sensors (ex – Prophesee). Neuromorphic vision sensors have been shown to have excellent properties (ex- speed, bandwidth, dynamic range) where they easily surpass conventional CMOS vision sensors. Beyond vision applications, neuromorphic

IN THE DOMAIN OF NEUROMORPHIC COMPUTING, HARDWARE DESIGNERS AND COMPUTER SCIENTISTS TAKE BROAD INSPIRATION FROM THE FINDINGS OF COMPUTATIONAL NEUROSCIENCE, AND OBSERVATIONS OF NEUROBIO-LOGISTS AND TRY TO BUILD ARTIFICIAL BRAINS IN SILICON

# TECHNOLOGY

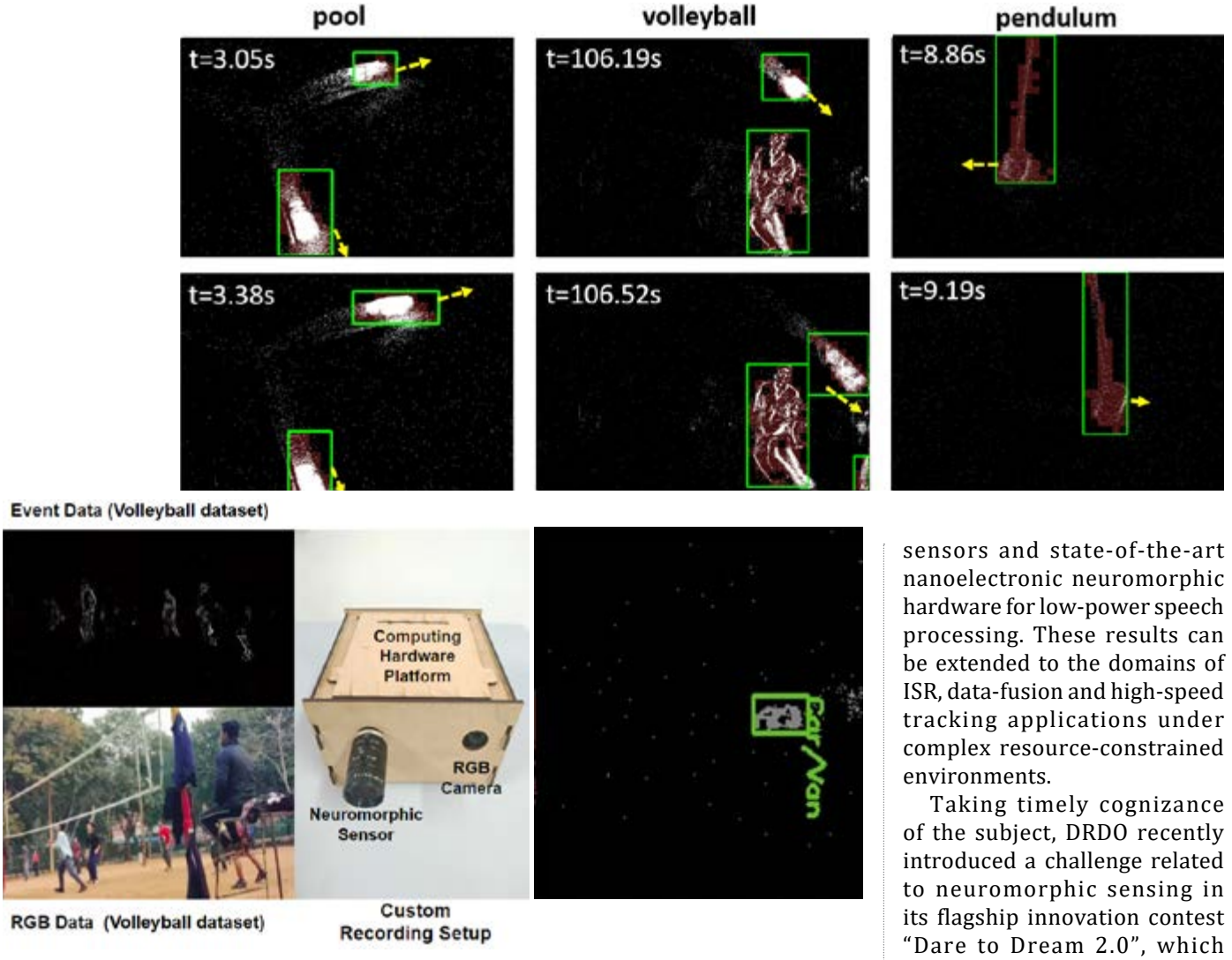


**Figure 3 Representative sequence shots recorded using neuromorphic sensors for different actions along with images of the custom hybrid sensors with built-in computing capability. Representative GIF recorded with neuromorphic vision sensor (Photo source: IEEE)**

computing has been successfully applied to multiple diverse fields such as artificial smell or 'olfaction', artificial touch/ skin, robotics, high-speed drones, cyber-security, navigation, optimisation, and speech-processing.

## INDIA'S SIGNIFICANT CONTRIBUTION

Although at a modest scale, universities, startups and industries in India are beginning to make a significant contribution towards cutting-edge R&D in the domain of neuromorphic computing and its applications. Some active Indian neuromorphic R&D groups include the likes of IIT-Bombay, IIT-Delhi, IISc and TCS-Research to name a few. Our IIT-D research group has been working in the domain for the last several years. In recent works, we have demonstrated ultra high speed, high dynamic range vision processing using neuromorphic event sensors and state-of-the-art nanoelectronic neuromorphic hardware for low-power speech processing. These results can be extended to the domains of ISR, data-fusion and high-speed tracking applications under complex resource-constrained environments.

Taking timely cognizance of the subject, DRDO recently introduced a challenge related to neuromorphic sensing in its flagship innovation contest "Dare to Dream 2.0", which had successful indigenous solutions developed by Indian universities and Startups. The next five years are certainly very exciting to watch out for new neuromorphic capabilities and products across multiple application domains.

*–The writer is a globally recognized deep tech innovator and Professor at IIT-Delhi. He is the founder of IIT-Delhi Start-up CYRAN AI Solutions. CYRAN builds edge-AI solutions for real-world applications. The witer was recognized by MIT Technology Review, USA as one of the top 35 innovators under the age of 35. His work has been recognized by IEEE, INAE, NASI, IEI, IASc. He has filed several patents and authored 90+ publications. Details on the R&D / innovations can be found at: https://web.iitd.ac.in/~manansuri/. The views expressed are personal and do not necessarily reflect the views of* ***Raksha Anirveda***

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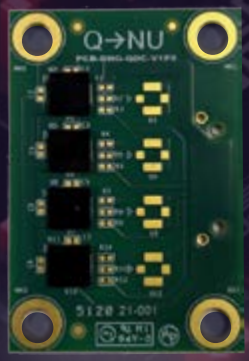


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VIEWPOINT

# PREPARATIONS, STRATEGY AND PLANNING FOR A FUTURE BATTLEFIELD MILIEU

Besides acquiring the latest high end technology weapon systems and imparting qualitative training to troops with a comprehensive intelligence network, the best way to approach a battle is to overstate the strategic manoeuvres in a way that it terrifies the opponent, convincing the adversary that you have combat ascendency and warfighting potential than your actual military capabilities. In war it is imperative to divert the enemy's attention and create defined state of turbulence with perception management, strategic surprise and deception

By **LT GEN (DR) SK GADEOCK**

The Eastern military strategy differs from the Western by focusing more on asymmetric warfare and deception. Chanakya's 'Arthshastra' has been an important strategic and political compendium. Strategy is a subdiscipline of warfare and of foreign policy, and it is a principal tool to secure national interests. Field Marshal Montgomery of Britain said: *"Strategy is the art of distributing and applying military means, such as armed forces and supplies, to fulfil the ends of policy. Tactics mean the dispositions for, and control of, military forces and techniques in actual fighting. Briefly, strategy is the art of the conduct of war, tactics the art of fighting."*

There are nine principles of war: Selection and Maintenance of Aim; Maintenance of Morale; Offensive action; Surprise & Security; Concentration of Force; Economy of Effort; Flexibility; Cooperation and Administration. All preparation and planning for war are based on these highly relevant cardinal principles by any armed forces of a nation.

There are fundamentally four levels of warfare - Political, Strategic, Operational and Tactical levels of war. The Indian Army has evolved over the years and in conformity to its transformative process, a new Deputy Chief of Army Staff (Strategy) has been posted, who has the responsibility of having the Director-General of Military Operations (DGMO), DG Military Intelligence, DG Operation Logistics and DG Information Warfare report to his office.

## INTELLIGENCE SHARING

*"An army may be likened to water, for just as flowing water*

*avoids the heights and hastens to the lowlands, so an army avoids strength and strikes weakness." – Sun Tzu (Chinese strategist)*

The single most important battle winning factor is 'good Intelligence' about the enemy, which transcends other essential factors for gaining ultimate success in the entire spectrum of conflict. If war breaks out, intelligence has distinctive strategic, operational and tactical roles for planning decisive battle victories with seminal success.

Strategic Intelligence is required for the formation of policy and military plans at national and international levels. It is concerned with broad issues such as economics, political assessments, military capabilities and intentions of foreign nations. Operational intelligence is focused on support or denial of intelligence at operational tiers. The operational tier is below the strategic level of leadership and refers to the design of practical manifestation. Tactical intelligence is primarily focused on support to operations at the tactical level and would be linked to the battlegroup. At the tactical level, briefings are delivered to patrols on current threats and time priorities. These patrols/ new multidimensional technologies with Skinware controls are then debriefed to elicit information for analysis and communication through the reporting chain. Intelligence should respond to the needs of national leadership, based on the military objective and operational plans.

## INFORMATION REQUIREMENT

Information requirement is generally related to terrain and impact on vehicle or personnel movement, disposition of hostile forces, sentiments of the local population and capabilities of the hostile order of battle. In response to the information requirements, analysts examine existing information, identifying gaps in the available knowledge. Where gaps in knowledge exist, the staff may be able to task collection assets to target the requirement. The OODA (Observe, Orient, Decide & Act) Loop is a four-step process for making effective decisions in high-stakes situations. It involves collecting relevant information, recognizing potential biases, deciding and acting promptly, then repeating the process with new inputs to the information matrix.

Analysis reports draw on all available sources of information, whether drawn from existing material or collected in response to the requirement. The causative analysis done and compiled in these reports are used to inform the remaining planning staff, influencing, planning and seeking to predict adversary intent. This process is described as Collection Co-ordination and Intelligence Requirement Management (CCIRM).

## ARTIFICIAL INTELLIGENCE

Artificial intelligence will indubitably have a vital role in future

# VIEWPOINT

"STRATEGY IS THE ART OF THE CONDUCT OF WAR, TACTICS THE ART OF FIGHTING," SAYS FIELD MARSHAL MONTGOMERY OF BRITAIN

military applications, where it will phenomenally and qualitatively enhance the empirical result-oriented compilations in hyper short spans. The military cannot ignore this disruptive technology with its manifold characteristics. Artificial intelligence tools can provide accretional value addition to the military, while alleviating concerns about vulnerabilities. Examples of such systems are medical-imaging diagnostic tools, maintenance-failure prediction applications, and fraud-detection programmes etc.

## TRAINING STANDARDS

The holistic training standards for highest proficiency levels of all ranks in the field formations must be achieved through designated Training Courses/ Modules/ cadres/ capsules, in consonance with the Standing Orders for War/Standing Orders for Peace. Physical Fitness Standards are to be achieved by all ranks to fight successfully in the extreme hard battlefield conditions. Health State (Medical condition) should be 'Excellent' of all ranks in all Field Formations prior to the war. The rationalisation of personnel is done to provide maximum battle strength to fighting units. Unit Reserves (UR) at 5 per cent are also posted to units in this state of war. This improves the 'Teeth to Tail' Ratio for the fighting units.

## WAR EQUIPMENT INVENTORIES

Large Inventories of military weapons and equipment are preserved in an exceptional state of operational serviceability. Armaments and all types of ammunition and various munitions are normally built up for war, with releases conducted by the Weapons & Equipment Directorate to reduce deficiencies. The maintenance of the equipment and stores is done by the Corps of Signals, Electrical & Mechanical Engineers (EME), Army Ordnance Corps (AOC), Army Supply Corps (ASC), and respective Directorates of Armoured Corps, Mechanized Infantry, Infantry, Engineers, and Services Directorates.

When war is imminent, the firepower of weapon systems is technically checked at firing ranges for accuracy and serviceability. Heavy Calibre Weapons & Associated Equipment, sensors with linked weapons are made fully accurate and serviceable. The technical tests and mechanical support provided by the EME and the associated testing of equipment is be done along with the AOC component in the training areas and the firing ranges. There are many variants of the night-vision devices (NVDs) for personnel in combat. These are mounted on weapons and on weapon platforms for creating better visibility conditions for night operations. The users and equipment compatibility are ensured for success on the battlefield. Specialised training is also carried out on the NVDs to attain high proficiency levels.

The Corps of Signals deals with plethora of communications equipment and its training in the Army is responsible for Electronic Warfare. The development of advanced technology for satellites and aircraft, both manned and unmanned, as well as computers, drones and varied applications has revolutionised military affairs; it also supports in the process of intelligence-gathering.

Indian soldiers aboard T-90 tanks

## MILITARY COMMUNICATIONS

There are six categories of military communications, including alert measurement systems, cryptography, military radio systems, nuclear command control, the signal corps, and network-centric warfare.

All radio sets used by personnel on man pack or vehicular mode are technically checked for their efficacy. The batteries and charging sets/generators/ satellite connectivity etc are made serviceable before the war. The reserves are also kept in readiness for battle and released to units in appropriate time frames.

## MILITARY LOGISTICS

*"The Line between Order and Disorder lies in Logistics" – Sun Tzu (Chinese Strategist)*

Military logistics is the science of planning and carrying out the movement & maintenance of armed forces, dealing with design

Indian military transport aircraft

& development, acquisition, storage, movement, distribution, maintenance, evacuation, and disposition of materiel, movement, evacuation, and hospitalisation of personnel, acquisition or construction, maintenance, operation and disposition of facilities and acquisition or furnishing of services.

Mobility of Forces is critical during mobilisation for war and depends largely on developed infrastructure. The nation's roads and railways are critical for the army for transportation, termed, 'Reserve Rolling Stock' (RRS). The Border Roads Organization (BRO) was set up to support the armed forces and meet their strategic needs and maintain the operational roads and infrastructure of the Army General Staff in border areas.

## MEDICAL SUPPORT

The planning and practice of the surgical management of mass battlefield casualties and the logistical & administrative considerations of establishing and operating combat support hospitals. A high-end technology spectrum of modernized medical equipment is required for the Army during Peace and War. From the lowest level of Section Hospitals, serviceable high mobility ambulances, trained paramedical attendants, equipment, surgical specialists, emergency stores, medical trains etc are coordinated and collectively galvanized into action for war.

The Field Ambulances/ General Hospitals/ Command Hospitals /R&R Hospital New Delhi support the casualties during conflicts. Upgrading all hospitals and making up deficiencies in medicine and war medical equipment is paramount, and 'sine qua non' to success in war. Air dropping of packaged medicines are catered for by air operations/ UAVs/ Drones depending on loads and priorities in battle.

## WAR-WINNING STRATEGY

*"When one treats people with benevolence, justice, and righteousness, and reposes confidence in them, the army will be united in mind and all will be happy to serve their leaders." – Sun Tzu (Chinese Strategist)*

The best way to approach a battle with a giant opponent is to dramatise a move in such a way that it terrifies the opposition, convincing them that you are much stronger than you actually are. Chinese philosopher Sun Tzu outlined several leadership strategies to win a war. Similarly, ancient Indian philosopher Chanakya (Kautilya) shared several leadership strategies to defeat enemies. He once remarked: "The enemy of your enemy is your friend." To win your war,

ARTIFICIAL INTELLIGENCE AND QUANTUM COMPUTING WILL HAVE A DYNAMIC ROLE IN FUTURE HYBRID WARS, AS IT WOULD INCONTRO-VERTIBLY ENHANCE SOLDIER'S PROFICIENCY, BATTLE EFFECTIVE-NESS, MITIGATE USER WORKLOAD, AND MILITARY SYSTEMS WOULD OPERATE WITH GREATER SPEED AND INTELLECTUAL COMPUTATION METHODO-LOGIES

# VIEWPOINT

Defence Minister Rajnath Singh flags off 51st J9 Vajra-T gun from L&T complex in Gujarat

you must utilise integrated joint strategy, tactics, and perception management, as part of 'information warfare'. Be prepared to be surprised and plan to surprise your enemy.

Divert your enemy's attention with strategic surprise and deception. Externally focus on activities that draw your enemy to the wrong side and internally focus on activities to win your end game. Focus on your strengths and concentrate on the weaknesses of your opponents. Build strong alliances based on trust and confidence to improve the strength and capacity to wage war.

## COHESION AND TEAMWORK

*"Be extremely subtle even to the point of formlessness.*

*Be extremely mysterious even to the point of soundlessness.*
*Thereby you can be the director of the opponent's fate."*

*Sun Tzu (Chinese Strategist)*

In the military, cohesion is a multi-faceted process. It involves interpersonal and social relations, task relations, perceived unity and emotions. This is also considered by leaders as another important war winning factor, comprising tactical acumen for planning operations, professionalism and sterling leadership qualities, to gain preeminent dominance over the adversary by retaining the desired 'Cutting Edge' in any type of terrain configuration and heterogenous operations of war.

A critical war winning factor is agile military leadership. The politicians should declare a military operation's objectives and then step aside and leave the business of war to the military superiors. All formation commanders as paragons of top-line leaders exhort their men to give their best during the war for their motherland. Every man fights for 'an inch of ribbon to emblazon his chest with blood & honour in war'. Morale is important in the Armed Forces because it improves unit cohesion and is usually assessed at a collective, rather than an individual level. In wartime, civilian morale is also an important facet of national power.

## VISION FOR 21ST CENTURY

Our vision for the 21st Century is to have a modernised, equipped and optimally structured professional army, enabling it to respond effectively to varied situations and demands, while it continually adapts itself to meet future challenges. Such a vision places emphasis on the ability to augment existing strengths, develop new soldierly skills, optimization of weapon platforms and systems in the network centric environment and transforming dynamics with innovative approaches to cope with the emerging hybrid

operational and autonomous warfare ecosystem. We have to be conversant and be fully prepared with the 'Gray Zone' warfare, encompassing multitude of activities which fall in between from nefarious economic activities, influence operations and cyberattacks to mercenary operations, assassinations, and disinformation campaigns activities that occur between peace (or cooperation) and war (or armed conflict).

The multidimensional challenges that confront us require deep introspection for up-gradation of the armed forces and accordingly develop suitable structures, Jointmanship and undertake Professional Military Education (PME) training towards integrated joint operations, ensuring decisive victory in future conflict situations. The impetus for the paradigmatic outlook and corresponding change must come from within and flow through the entire military DNA. We must not forget that the triumphant armies of the future will not necessarily be the ones that have greater combat power but ones that can visualise, comprehend and anticipate battles more clearly, execute synergised actions with insightful multi-level intelligence and rehearsing all the possible contingencies. The overall Grand Strategy for war campaigns must be war-gamed and simulated by the CDS along with the Integrated Theatre Commanders (on creation), Chiefs of the tri-services, senior military strategists and defence analysists to coherently define the military aim in conformity with the political aim, resonating with the principles of Art of War.

*-The writer is a military scholar. Presently, he is DG, Amity Institute of Defence & Strategic Studies). The views expressed are of the writer and do not necessarily reflect the views of* ***Raksha Anirveda***


# PRIVATE SECTOR CONTRIBUTION HELPS INDIA ACHIEVE DEFENCE EXPORTS WORTH RS 13,000 CRORE

**New Delhi.** With the private sector playing an important role in aerospace manufacturing — both manned and unmanned aircraft, India's defence exports touched a record Rs 13,000 crore in the 2021-2022 fiscal, said Defence Secretary Ajay Kumar July 8. Interacting with a group of media person, Defence Secretary Kumar said, "The total defence export in 2021-2022 stands at Rs 13,000 crore."

Additional Secretary in the Department of Defence Production, Sanjay Jaju said that the increase in exports stood at "eight times" of what it was around five years ago.

Responding to a question, Defence Secretary Kumar said, " The ratio of exports between government-owned defence public sector undertakings (PSU) and private firms stood earlier at 10:90, it is at 30:70 currently."

According to sources, the reason behind rise in defence PSU share from 10 per cent to 30 per cent is the nearly Rs 2,500 crore BRAHMOS missiles deal that India made with Philippines. A majority of the country's defence export is in the aerospace sector, where Indian firms have been manufacturing several parts, including fuselage for foreign companies, added the sources.

For example, all fuselages of American attack helicopter Apache sold across the world are now made in India by a joint venture between Boeing and Tata. Similarly, companies like Adani Defence and Lohia Group are making fuselages for several Israeli drones.

The biggest beneficiary of India's defence exports in the last five years has been Myanmar. According to Stockholm International Peace Research Institute data on international arms transfer trends, roughly 50 per cent of India's defence exports from 2017 to 2021 were to Myanmar, followed by Sri Lanka at 25 per cent, and Armenia at 11 per cent.

Two years back, in 2020 the government had set a target of Rs 35,000 crore ($ 5 billion) export in aerospace, and defence goods and services in the next five years. This is part of the turnover of Rs 1.75 lakh crore ($ 25 billion) in defence manufacturing by 2025 that the government is aiming to achieve.

OPINION

# SITUATIONAL AWARENESS: THE 'MANTRA' FOR FUTURE-READY ARMED FORCES

Situational awareness is nothing less than a blessing in disguise for the armed forces and is already beginning to make its presence felt in war and peace. The Azerbaijani military victory in the 44-day-long Azerbaijan-Armenian war was largely due to better situational awareness in the Azerbaijan armed forces

By **SAI PATTABIRAM**

We all are today more aware of the developments both in our immediate neighbourhood as well as across the globe and more connected to each other than ever before. We are able to communicate across the world in a fraction of a second. We are all situational aware of matters that concern us and can track such events live as they happen. This awareness helps us avoid roadblocks and plan our journey and movements better.

All this is possible because of multiple data sources like mobile phones, vehicle tracking devices, and cameras using wireless networks, Wi-Fi databases and user-friendly dashboards.

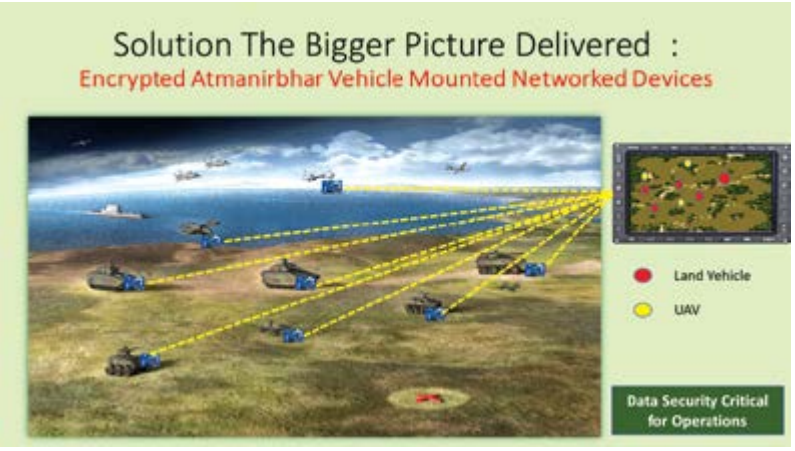
Situational awareness is nothing less than a blessing in disguise for the armed forces and is already beginning to make its presence felt in war and peace.

The Azerbaijani military victory in the forty-four-day-long Azerbaijan - Armenian war was largely due to better situational awareness in the Azerbaijan armed forces.

Sensors, cameras or wireless communication systems in use today are some to the technological tools for a higher level of situational awareness. They are easily available and can be deployed across a range of devices like drones, IoT, and connected mobility to name a few.

As far as defence services are concerned, the quest mainly is to there by removing the human element from the danger zone. The Ngarnokarbakh war and the more recent Russo-Ukraine conflict are some examples of this fact.

The first and the most sought-after technological application of situational awareness is



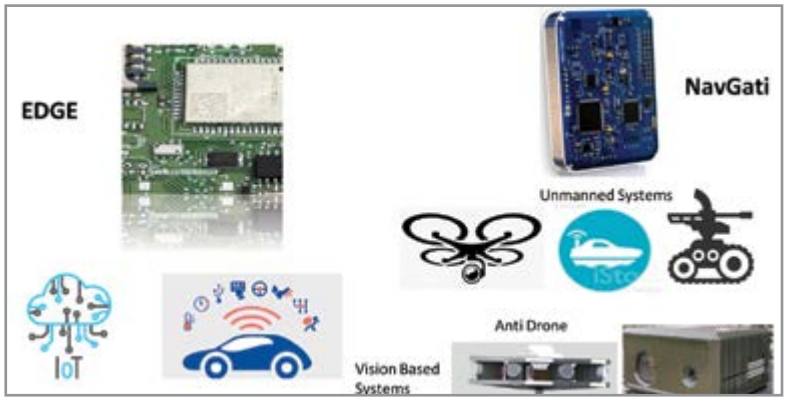

integrate them into a single rugged, secure, militarized solution that can be rapidly deployed across terrains and geographies.

## TECHNOLOGIES TO ENHANCE SITUATIONAL AWARENESS

Enhanced situational awareness is all about embedded electronics and their ability to acquire, transmit and automate systems unmanned systems commonly known as drones.

The autopilot of a drone is the piece of embedded electronics that replaces the need for the human controllers in the air, ground or water.

UAS (unmanned aerial systems), UGV's (unmanned ground systems) & USV's (unmanned surface systems – boats) today are the most sought-after defence products.




The UAS literally changed the course of the war in favour of Azerbaijan. The completely asymmetric outcomes in this war were a direct result of the deployment of UAS and loitering munitions which essentially are Kamikaze Drones.

Surprisingly some of the prime movers behind this unpredictable shift in warfare are not the traditional defence manufacturing heavyweights like the USA, Russia, Germany or Israel but countries like Turkey and Iran.

The fact that Turkey and Iran have been able to build capacities in this new technological domain clearly indicates that with the right kind of policy support and direction it is possible to develop indigenous products and capabilities in this future critical domain. The single most critical component of situational awareness technologies is the "complete end-to-end control of the critical control and communication electronics from design stage including firmware".

This is essential to ensure security, operational flexibility, and future-readiness for upgrading and widening the applications and scaling in size.

Zuppa's NavGati and Edge are future-ready fully aatmanirbhar motherboards designed from the ground up to ensure India's complete self-reliance as far as "situational awareness" electronics is concerned.

*–The writer is Director of Zuppa Geo Navigation Technologies Pvt Ltd*

BUSINESS INITIATIVE

# SCHIEBEL'S CAMCOPTER® S-100: EXPANDING ITS FOOTPRINT ACROSS CONTINENTS

Schiebel's revolutionary CAMCOPTER® S-100 unmanned aerial vehicle has a proven capability for military and civilian applications.


The continuous focus by Schiebel Group on the development, testing and production of the revolutionary CAMCOPTER® S-100 Unmanned Air System (UAS) has helped it built an international reputation. The Group has been producing high-tech military, commercial and humanitarian products, which are backed by exceptional after-sales service and support.

Schiebel's CAMCOPTER® S-100 UAS is a proven capability for military and civilian applications. The Vertical Takeoff and Landing (VTOL) UAS needs no prepared area or supporting launch or recovery equipment. It operates day and night, under adverse weather conditions, with a range of up to 200 km, both on land and at sea. The S-100 navigates automatically via pre-programmed GPS waypoints or can be operated directly with a pilot control unit. Missions are planned and controlled via a simple point-and-click graphical user interface. High-definition payload imagery is transmitted to the control station in real time. Using "fly-by-wire" technology controlled by redundant flight computers, the UAV can complete its mission automatically in the most complex of electromagnetic environments. Its carbon fibre and titanium fuselage provides capacity for a wide range of payload /endurance combinations.

The use of latest design technologies by Schiebel has resulted in optimising and enabling its unmanned aircraft to go further than ever before. The 3D-printed design off the ground demand for unmanned air systems (UASs) has grown massively over the last decade, with significant advances made in both the range and robustness of vehicles. Schiebel's Camcopter S-100 has proved to be one of the most versatile UAS, thanks to its design flexibility which perfectly balances fuel economy with toughness.

Schiebel has engineered the S-100 to be as light as possible to increase the vehicle's reach, optimising the design for performance, while ensuring airworthiness. To ensure a perfectly tuned architecture and a lightweight design, while increasing stiffness and strength at the same time, Schiebel's engineering team performed a wide range of simulations, especially to optimise the design of additively manufactured engine parts.

Since 2020, Schiebel has had in-house metal 3D printing capabilities. It uses an EOS M 400-4 metal 3D printer to manufacture landing gear brackets and titanium parts for its S-100 rotor engine, helping maximise durability and power output from the smallest possible weight and size.

The combined use of additive manufacturing and simulation driven design has helped reduce the weight of components by up to 50%, while increasing

stiffness and strength by the same amount. Another major benefit of this simulation-led approach is a reduction in printing costs which allows Schiebel to further increase endurance or payload capacity, keeping the company at the leading edge of aerial innovation and giving its designs the widest range of possible uses.

The company has customers in five continents with a team of 300 dedicated professionals working across the globe in Austria, US, UAE and Australia. It follows a customer-centric approach, and offers various services to customers such as (a) customer support (b) technical support, and (c) quality support.

Schiebel has been focusing on the Indian market due to the large number of developing requirements for Unmanned Air Systems (UAS). The unmanned landscape in India is promising and set to grow in the next decade. Schiebel wants to be a part of this growth story along with VEM Technologies, who are supporting them in their endeavour. The group's has plans in place to support and grow with the Indian industry by creating jobs and developing technology and offering the best Vertical Takeoff and Landing (VTOL) UAS available in the global market.

The company has also been working on providing UAVs for maritime reconnaissance considering that the Offshore Patrol Vessels (OPVs) are the fastest growing segment of the naval vessels with the total number of such vessels being used in 87 countries totalling 839.

Another area of focus of these S-100s is underwater surveillance in the maritime sector with the increasing number of submarines. The use of these unmanned aerial aircraft would enable nations to keep track of submarine movement as the S-100 has the capability to monitor underwater vessels.

The company is now working to develop larger copters weighing 500 kgs to 600 kgs called S-300. "We want to get the S-300 completely right before we enter the market," officials said.


The company also provides a state-of-the-art Remotely Piloted Aircraft Systems (RPAS) that are fully certifiable in order to maintain technological advantage. It is partnering with the best technological providers and partners as and when needed for global, industrial and humanitarian use.

According to available figures, the VTOL UAS market continues to grow with reports suggesting it to have risen from US$408 million in 2019 to US$2.6 billion by 2030 at a CAGR of 19.7 per cent.

In business for almost 70 years, Schiebel has a very versatile range of products with multirole capability ranging from stationary deployment, mobile deployment, maritime operations and interoperability.

Every year, Schiebel puts in more than 20 per cent of its revenue into R&D to stay on top and get even better. As the company Chairman said, "We are dedicated to the production of the unmanned helicopter CAMCOPTER® S-100. The journey has been tough and challenging with multiple ups and downs, and it has taken many years of hard work to achieve our goals."

"WE ARE DEDICATED TO THE PRODUCTION OF THE UNMANNED HELICOPTER CAMCOPTER® S-100. THE JOURNEY HAS BEEN TOUGH AND CHALLENGING WITH MULTIPLE UPS AND DOWNS, AND IT HAS TAKEN MANY YEARS OF HARD WORK TO ACHIEVE OUR GOALS"

GUEST COLUMN

AMIT COWSHISH

# REALISM IN SETTING THE REQUIREMENT KEY TO THE SUCCESS OF MRFA ACQUISITION PROGRAMME

The success of the MRFA acquisition programme will depend to a considerable extent on how realistically the Qualitative Requirements and other terms are formulated, and the freedom given to the original equipment manufacturer to decide how the aircraft are to be built in India

Quite recently, on June 27, Air Chief Marshal VR Chaudhary, Chief of the Air Staff, Indian Air Force (IAF) said that the original equipment manufacturer (OEM) selected for the 114 multi-role fighter aircraft (MRFA) acquisition programme will have to ensure transfer of technology (ToT) to the Indian manufacturer as the aircraft was going to be acquired under the 'Make-in-India' framework.

He was referring to the IAF's longstanding plan to build a 42-squadron strong force -a far cry from the current strength that is hovering perilously around 30 squadrons. The unexpected inter-governmental deal of 2016 to acquire 36 Medium Multirole Combat Aircraft (MMRCA) in a fly-away condition from Dassault Aviation of France, was just a flash in the pan.

Nothing much has happened since then except for the order placed on the state-owned Hindustan Aeronautics Limited (HAL) in February 2021 for acquisition of 83 indigenously designed and built Light Combat Aircraft (LCA) at a cost of Rs 48,000 crore. These aircraft cannot, however, supplant the need for multirole aircraft that IAF continues to aspire for.

The Air Chief's statement sounded more like a prescient warning than a foretaste of what the OEMs should expect when the tender is issued for acquisition of the MRFA. It wasn't necessary. Considering the unstinting fuss over 'Make-in- India', indigenisation, and self-reliance in defence production in the recent years, no one is in doubt about what the government wants: transfer of state-of-the-art technologies to the Indian companies.

The question is whether what IAF wants is out there for the asking. This question assumes significance in the shifting sands of the contemporary geopolitics following the Russian invasion of Ukraine which is now in the fifth month of savage militarism. Though India continues to be a potentially important destination for the global defence companies, in the current scenario the European defence market too has emerged as a lucrative alternative for them.

At the annual leadership summit of the North Atlantic Treaty Organisation (NATO), President Joe Biden announced on June 29 that 'the United States will enhance (its) force posture in Europe and respond to the changing security environment as well as strengthening our collective security'. He also announced permanent basing of a US military garrison in Poland, dispatch of two additional F-35 fighter jet squadrons to the UK, and provision of more air defence and other capabilities to Germany and Italy.

Meanwhile, three days after Russia invaded Ukraine on February 24, Germany committed 100 billion euros ($107bn) to a special fund for its military and decided to raise its defence budget above 2 percent of the gross domestic product (GDP), something that it had avoided for long. Other countries are likely to follow suit. With so much happening in Europe, the demand for military hardware and services by the NATO member countries themselves will increase, with concomitant increase in their budget outlays which had been shrinking over the years.

THE COMBINATION OF IMPROVED BUSINESS PROSPECTS, HIGHER DEFENCE SPENDING, AND COMPARATIVELY PAINLESS PROCUREMENT PROCEDURES ACROSS EUROPE, COULD TAKE SOME SHEEN OFF INDIA AS A LUCRATIVE MARKET FOR THE MILITARY HARDWARE

The combination of improved business prospects, higher defence spending, and comparatively painless procurement procedures across Europe, could take some sheen off India as a lucrative market for the military hardware. Meeting the demand of the European countries to beef up their security is also going to take priority with the OEMs vis-à-vis the potential supplies to India.

This could affect the timeline for acquisition of 114 MRFAs for

which the Request for Information (RfI) was issued more than three years ago in April 2019. The main contenders for this approximately US$ 18 billion programme are Lockheed Martin's F-21, Boeing's Super Hornet F/A-18 E/F, Dassault Aviation's Rafale, Saab's Grippen JAS39 E/F, Russia's MiG 35 and Su-35, and the European Consortium's Eurofighter Typhoon. All of them would be happy, if not happier, doing business in Europe.

The absence of any perceptible progress since the RfI for 114 MRFA was issued in 2019, preoccupation of the US and European OEMs with augmenting collective defence capabilities across Europe, and the difficulties involved in doing new business with Russia, are a cause for concern for the project, but more daunting challenges lie ahead.

The foremost challenge is the formulation of the Qualitative Requirements (QRs), primarily the technical specifications which the equipment offered by the OEMs must comply with. Though not common in the IAF programmes, setting the right specifications has been problematic in defence acquisition programmes across the services.

A recent manifestation of this problem was the French industrial conglomerate Naval Group pulling out of India's Project 75 (India) which entails construction of six conventional diesel-electric submarines at an Indian shipyard with technology transfer from the OEM. Other contenders from Germany and Spain, too have reportedly withdrawn from the programme, leaving only South Korea in contention.

One of the main reasons for these companies to back out was the requirement that the OEM should be able to offer sea-proven Air Independent Propulsion (AIP) System for the submarines. Apparently, none of these companies can do that.

The Indian Navy (IN) would have surely known this when it issued the Request for Proposal (RfP) to two Indian shipyards asking them to tie up with the shortlisted foreign manufacturers and submit their bids. Inexplicably, however, this knowledge did not prevent IN from stipulating the requirement of AIP system in the RfP.

Though Project 75 (India) project is being processed under the Strategic Partnership (SP) category and the MRFA programme under Buy (Global – Manufacture in India) category, QRs form an essential part of both these categories. Unrealistic QRs, especially regarding ToT, across all acquisition categories, come in the way of first closing the deal and later ensuring compliance by the OEM.

Some other terms and conditions too can be problematic. It may be recalled that the aborted programme for acquisition of 126 medium multirole combat aircraft faced a prolonged stalemate on account of, among other things, issues concerning the respective workshare and responsibilities of the OEM and HAL. It is unfair to expect the OEM to take responsibility for certification and quality assurance of the aircraft manufactured locally by the Indian company on which it does not have a decisive, if not full, management control. Such conditions in the RfP can prolong, if not entirely derail, the acquisition programmes.

Assuming that there will be no budgetary constraint, success of the MRFA acquisition programme will depend to a considerable extent on how realistically the QRs and other terms are formulated, and the freedom given to the OEM to decide how the aircraft are to be built in India.

The Defence Acquisition Procedure (DAP) 2020 permits the OEMs to manufacture the equipment/platforms through a joint venture, an already existing company, or even their subsidiaries in India. The MoD should not shy away from permitting, or discourage, the OEM selected for the MRFA programme to manufacture the aircraft through a wholly owned subsidiary, if that is what the OEM prefers. The need to build up IAF's capability should override all other considerations.

***– The writer is Ex-Financial Advisor (Acquisition), Ministry of Defence***

IT IS UNFAIR TO EXPECT THE OEM TO TAKE RESPONSIBILITY FOR CERTIFICATION AND QUALITY ASSURANCE OF THE AIRCRAFT MANUFACTURED LOCALLY BY THE INDIAN COMPANY ON WHICH IT DOES NOT HAVE A DECISIVE, IF NOT FULL, MANAGEMENT CONTROL

COVER STORY

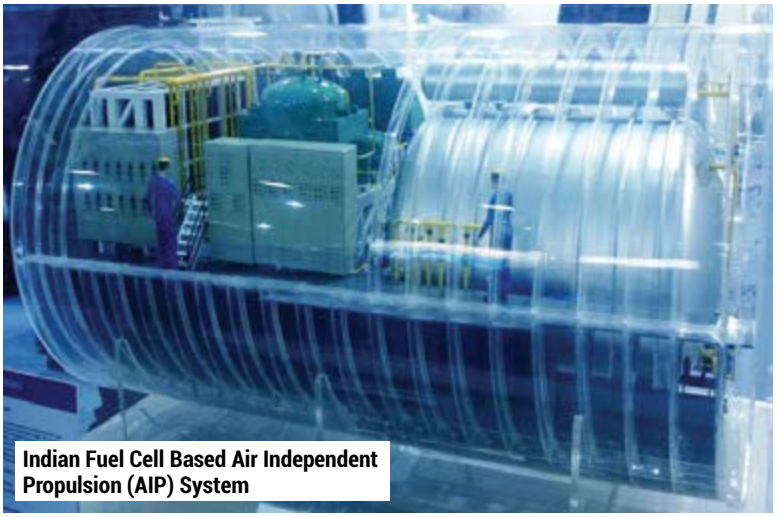

INS Kalvari Class

There are strong possibilities for the SP model on submarines to take off, the roadblocks notwithstanding. What is needed is a risk-taking attitude, focus on developing indigenous capability with collaborative support

# BREATHING LIFE INTO THE STILLBORN STRATEGIC PARTNERSHIP MODEL

By **AJIT K. THAKUR**

China is a bully, and like all bullies, the communist dictatorship only understands the language of force. In 2017, when the Indian and Chinese militaries were engaged in a Mexican standoff in Doklam, China's state councillor Yang Jiechi and India's National Security Advisor Ajit Doval met to discuss the presence of Indian troops at Doklam. Yang asked: "Is it your territory?" Doval replied that the territory belonged to Bhutan, and said: "Does every disputed territory become China's by default?" The Chinese got the message and backed off. Despite finding itself in a strategic sweet spot amid the ongoing global order churn, India hasn't been really able to capitalise on the economic, strategic and military opportunities that have opened up.



Indian Fuel Cell Based Air Independent Propulsion (AIP) System

INDIAN NAVY THAT HAS SPEARHEADED THE INDIGENISATION EFFORT WITH SUCCESS IS STARING AT ITS OWN VULNERABILITY, UNPREPARED TO FACE THE MULTIPLE CHALLENGES AHEAD

"When the boat comes up for retrofitting in 2025, it will be fitted with the indigenous AIP which has been made in India by DRDO and Indian industry. Work is going on to develop a module which has to be fitted on the submarine when it comes. There are industry partners including Larsen & Toubro and Thermax, and the Naval Materials Research Laboratory (NMRL) of DRDO which has developed this."

Dr G Satheesh Reddy, Secretary, Department of Defence R&D and Chairman DRDO said recently in a conversation with Financial Express Online

The sweet spot window is a small one that emerged as a result of west's bigger game of wreaking Russia and to wean away India from Russian influence. For the west, it is an important milestone. Till the time India buys from Russia, the power game of the west is incomplete and sanctions won't work. Moreover, the ongoing Ukraine war has forced western countries to increase their defence budget. The opening of their defence market which till now was either closed or had very low business value has led to the reduction of interest in India.

And, India can't just blow this historic, sort of unimaginable and once-in-a-generation opening to realise its aspiration of being a responsible global power.

The continuous chanting of Atmanirbhar Bharat and Make in India and push by the government to achieve Atmanirbharta in Defence hasn't yielded the result as perceived. Why is it still an underperforming initiative? Why there is no solution to country's defence technology, affordability and quality woes?

Everyone is clueless, be it Armed Forces, defence industry or the government and as a result, the strategic autonomy in defence to leverage India's rise as global power remains elusive. The main issue is with uncertainty of order flow as numbers don't justify investment by private companies and DPSUs alike.

In the global power play, a nation's heft is determined by varied factors like its robust maritime capabilities, technology leadership, economic prowess and military power. India has to cover a lot of ground to justify its stake in the power play. It's the best time for India to step up its efforts and take advantage of the current geopolitical situation to fix up its indigenous defence capabilities.

## NAVAL THRUST

So, to give a head start—India can begin by paying special attention to the Indian Navy's requirement

# COVER STORY

South Korea inaugurates new 3000 ton submarine

THE BIDS THAT WERE TO BE SUBMITTED BY DECEMBER 2021, APPARENTLY GOT EXTENDED TO JUNE 2022 AS IT BROUGHT TO THE FOREFRONT THE INHERENT FLAWS AND DISCOMFORT OF THE FOREIGN COMPANIES

in order to strengthen its maritime capabilities and close in the widening gap with its northern neighbour—China—which has emerged as a formidable naval power.

In today's world where it is difficult to hide ships and land and air assets, submarines continue to remain undetected and are formidable platforms with their lethality as they carry the complex weapon suite. While India doesn't have a direct maritime threat from China (which would be land and air), credible submarine fleet allows it the sea denial capability to disrupt China maritime ambitions, in IOR.

It's an irony that the Indian Navy which has spearheaded the indigenisation effort with success is staring at its own vulnerability, unprepared to face the multiple challenges ahead.

Its 30-year plan to induct 24 submarines by 2030 is well behind schedule and the new initiative—the Strategic Partnership (SP) model, taking note of the recent development, in all probability may end up as a stillborn. Nothing unusual about it as many such initiatives have been blown out without a start in the past.

As Project 75 is nearing completion with the last of submarines scheduled to be commissioned next year, the follow-up Project 75 (I) under the strategic partnership (SP) model to build anothersix submarines is facing headwinds now for myriad reasons.

The SP model, first proposed by Dhirendra Singh committee in 2013 was introduced six years ago in 2016. It involved one nominated Indian private company and foreign OEMs (shortlisted by MoD). The idea was very simple, build capabilities in private sector and make them stand at par with DPSUs. It intended to 'institutionalise a transparent, objective and functional mechanism to encourage broader participation of the private sector, in addition to capacities of DPSUs/OFB, in manufacturing of major defence platforms. It included submarines, fighter aircraft, helicopters, and armoured fighting vehicles.

The submarine programme – Project 75(I) is the first to be progressed under the SP concept and its progress so far has been disappointing to say the least.

Right from the start, the concept of strategic partnership was a flawed one as it lacked transparency and clarity on functional mechanism. Moreover, my observation from the side-lines has been that it was bugged with hidden deep state agendas which have been continuously at play without getting traced or identified since independence. Had not this been the case, India would have been close enough in

## 'Navantia Will

*While working on the article, the writer interacted with Navantia's India Director Fernando Formoso and posed three questions to him. His response was straight forward. Excerpts:*

**The 75I project is witnessing exodus of strategic tech partners… latest being Naval Group. According to media reports, Navantia too is not keen. Is it true?**

Navantia is willing to support Indian Navy to achieve strategic goals of self-reliance in the military shipbuilding, providing a state-of-the-art engineering after our own success with the Spanish Navy's S80 class submarine.

As per our knowledge, there have not been any official announcements regarding SPs selecting OEMs as partners for the offer, therefore offers have not been prepared, delivered, or even withdrawn by any of the competing OEMs. It is true that there are some challenging requirements that seem difficult to meet by the OEMs.

In any case, we are working hard to get a fully compliant solution with the current constraints of the RfP, therefore Navantia would like to highlight its commitment to the Indian Navy processes, specifically for this project, where we have been

achieving its self-reliance goal and technological autonomy.

## PROJECT 75(I)

Stalled now with uncertain future, the Project 75(I) programme cannot be abandoned or delayed further. It will be a strategic disaster. Anchored in the Indian Ocean region, India's role as a strong maritime power and its potential to exploit China's strategic vulnerabilities assumes significance in context of the larger global power game.

The Indian Navy managed the selection process of shortlisting the foreign and Indian companies smoothly, despite the process being cumbersome and contentious. The only surprise being the further dilution of the SP model, as the short-listing of the state-owned Mazagon Dock Shipbuilders Ltd (MDL) alongside the private sector conglomerate Larsen & Toubro (L&T) was against the spirit of the new concept.

The foreign companies shortlisted for Project 75 (I) were Naval Group (France), ThyssenKrupp Marine Systems (Germany), Rosoboronexport (Russia), Daewoo (South Korea), and Navantia (Spain).

Subsequently, last year in July, the Request for Proposal (RfP) for six submarines was issued to the two Indian shipyards, specifying that they could tie up with any one of the shortlisted foreign companies for the project. The bids that were to be submitted by December 2021, apparently got extended to June 2022 as it brought to the forefront the inherent flaws and discomfort of the foreign companies.

# be Always Adaptive to the Rules of the Program'

**Fernando Formoso Freire, Director India, Business Development & Commercial Division, Navantia (SEPI Group)**

working hard since the first day to provide the IN with a solution.

Timing and contractual requirements have been very exigent, and of course, we would be more confident if some requirements where relaxed. Nonetheless, we still believe that we have a very good product and highly experienced engineering skills to develop the best solution to the Indian Navy.

In short, we are still there, and we will keep on working to develop our proposal with the key providers to get the Indian Navy the best solution to the P75I project.

**Considering the situation where 75I project undergoes amendments to remove the irritants issues, will Navantia be interested to be a strategic partner?**

Of course, as I just mentioned, Navantia is still working under the current requirements, aiming a full compliant solution where the stakeholders will be achieving a positive outcome of the process, always under the Indian Government self-reliance strategy.

Navantia has supported other navies and foreign governments to develop their industries. The P75I is not going to be different at all. If some of the tough issues could be removed, it would make the path easier, and more profitable for all the stakeholders, as everyone can focus on getting the final user the required capabilities through a powerful design.

Navantia will be always adaptive to the rules of the program. Even though if nothing changes, our determination to support this project will remain the same. As a government-owned company, we will pursue the best outcome on the program results, supporting the good relationship between India and Spain, doing what we do the best, which is military shipbuilding.

**In a scenario, though hypothetical now, L&T and MDL join hand through a SPV with government approval to work on the submarine project. Would Navantia associate with it as technical consultant?**

If L&T and MDL would get to join efforts for this project, Navantia would still be eager to contribute to this SPV, providing our best endeavours to deliver the P75I project. We are open to work with either of the Strategic Partners (SP), and we feel very confident in working with both, as we have proved it in the past with both companies.

Again, Navantia is adaptive to the required typology of contract structure, and would be thrilled to join efforts with two reference entities in the naval shipbuilding activity as MDL and L&T. We believe we can provide state of the art engineering and best practices to support both corporations, and if an SPV is the path that will be required for us to walk, we would definitively bring our best practises to make this program get to the end successfully.

Both MDL and L&T have great shipbuilding capabilities and through a long-term relationship, we are confident that the program will achieve its objectives. Submarines are the most complex naval units of the maritime forces and would definitively need the outmost efforts of the most skilled companies to get to the best product, so we would be happy if we could get involved in this SPV.

# COVER STORY

## AIMING TOO HIGH?

Talking of flaws, the unrealistic and ambitious specifications of the Services Qualitative Requirements (SQRs) that included unproven AIP technology and certain RfP conditions made the foreign companies uncomfortable. Eventually, it led to some misrepresentation of facts and some error on MoD's part in shortlisting the foreign companies.

Later on, according to some unconfirmed reports, it emerged that ThyssenKrupp got uncomfortable with the requirement of indigenous content in the submarines and the extent of liability of the foreign partner. Similarly, Navantia has issues with the RfP and Daewoo wants some changes in the RfP conditions.

And with the recent announcement made by the Naval Group to pull out of the Project 75(I), it looks like the submarine project is headed towards a dead end. The Naval Group cited certain conditions in the RfP behind their inability to submit the bid submission. All these issues bring out the fact that the concerns of the OEMs during the discussions phase were not taken seriously. Biggest stumbling points are few – indigenous AIP, size and liability.

Hence, would it be prudent to make the changes in RfP? Nope, would be the unanimous response as making changes in RfP are procedurally cumbersome, time consuming and prone to delays. And defence dealing with Russia (ROE) in the present context, puts India in a tight spot as it cannot ignore threat of sanctions by US and its allies. In my opinion the RfP and the program can be salvaged. Also, another factor which is critical is that Indian companies don't have the capability to make in India the entire submarine. Thus the program's indigenisation component (IC) has to be a step up function aiming to achieve credible IC in the last submarine of the project.

Suggesting a more practical way to resolve the issue, former financial advisor to the Ministry of Defence, Amit Cowshish in his recent article opined, "Amend the RfP by deleting the requirement for AIP altogether, make other changes that's acceptable to all concerned, provide another chance to the Indian companies to negotiate tie-ups with the shortlisted foreign companies and bid for the project. However, the RfP should stipulate that the foreign company will be required to extend all support to the selected Indian company at a later stage in upgrading the submarines with DRDO's AIP."

Cowshish further adds that moving forward, MoD should also consider de-complicating the projects that entail manufacturing of foreign-origin equipment, weapon system or platform in India referring to the Airbus-Tata's Buy and Make contract that was awarded by MoD for 56 C-295MW transport aircraft to replace the ageing fleet of Avro aircraft.

The chronic policy flip-flops and delayed decision-making have brought the submarine force-levels of Indian Navy to an abysmal low along with rapid obsolescence. And the hope Project 75(I) worth Rs 43,000 crore brought for the Indian Navy and ship building industry

Indian Scorpène Submarine


C-295 aircraft

in its wake is in a state of limbo.

A timely execution of the project would have ensured the seamless follow-on to the Scorpene project, serial-production and indigenisation of the vital weapon-platform and would have given a lifeline to Mazagon Docks (MDL) to continue with its state-of-the-art submarine-building facility, without losing expertise and highly-skilled workers.

Highlighting the added complication that has arisen with the development of indigenous AIP system by DRDO, former Navy chief Admiral Arun Prakash wrote in his article, "Based on electrolytic fuel cells, this system produces energy by combining hydrogen and oxygen with only water as the waste product. It has no moving parts and is safer and more efficient than others.

The drawback, however, is that the 8-10 metre-long AIP module has to be installed on a submarine and subjected to stringent underwater trials before the Indian Navy can accept it as "operationally proven" for induction into service. Since installation and trials of this module will be a complex and time-consuming process, three major issues are likely to arise: (a) who will provide a submarine for trials? (b) who will undertake installation and conduct trials? and most crucially, (c) who in our system will take such crucial decisions in a timely manner?

According to Admiral Arun Prakash, there should be no further delay and it's important enough to attract the time and attention of our highest decision-makers. He suggests that a practical way forward may be for one of the strategic partners and DRDO to jointly seek a foreign collaborator for P-75(I) who will install the indigenous AIP on the selected submarine and conduct collaborative trials. Once proven at sea, the indigenous AIP could be installed in all new subs and retrofitted in the old ones.

This is to say that infusing life to the stillborn submarine Project 75(I) under the Strategic Partnership model is very much feasible.

The Indian defence establishment and decision makers should re-evaluate the process with urgency. They should set up a new entity as a special purpose vehicle (SPV) with Larsen and Toubro (L&T) and Mazagon Docks (MDL). The executive management could be with Larsen and Toubro. Larsen and Toubro's management of the SPV will hopefully ensure timely delivery given their track record.

The SPV can rope in any one or two foreign companies as technology consultants. MDL with its skill-set and experience in building Scorpene submarines, Indian Navy's design support and end-user insights and DRDO as technology provider may provide the much-needed thrust to steer the project ahead.

Most importantly, the MoD's focus should be on bigger issues and to resolve them. The dockyard and Navy can manage the technical aspects very well and the decisions to be taken at MoD level are – RfP changes, DRDO AIP. Every design will have some positive and some negative. The need is to finalise one and move ahead with the tactics to be built around that technology.

India should also learn lessons from other countries (South Korea and Australia) who have taken this path and succeeded. Examining their model and how they went about, would provide the right clue to pick from where they left and help India avoid the complex and cumbersome reinventing the wheel process, altogether.

Technology transfer in real terms never happens as some critical components of technology are always out of bound. And, even if it comes, the price to be paid is exorbitant and India's experience has been bad on this front. It's time to discard the risk-averse attitude and indulge in indigenous technology development with collaborative support of technology partner. To make it happen, some tough decision needs to be taken. Is India prepared for it?

A PRACTICAL WAY FORWARD MAY BE FOR ONE OF THE STRATEGIC PARTNERS AND DRDO TO JOINTLY SEEK A FOREIGN COLLABORATOR FOR P-75(I) WHO WILL INSTALL THE INDIGENOUS AIP ON THE SELECTED SUBMARINE AND CONDUCT COLLABORATIVE TRIALS

## MUSINGS FROM RUSSIA

Russian President Vladimir Putin welcoming Prime Minister Narendra Modi

**India's privileged strategic partnership with Russia and the depth of its ties with Moscow are very deep. Despite the radically changed strategic calculus, Indo-Russian partnership will emerge stronger post-Ukraine crisis**

# WITH INDIA IN MIND

By **VINAY SHUKLA**

Global developments over the five-month-old Russian "special military operation" in Ukraine have radically changed the strategic calculus since the Soviet collapse in December 1991 and the US-led unipolar post-Cold War world order. The Russians have learned the hard way that free market, global economic, and financial systems can be easily weaponised, and individual powers seeking to protect their core national interests do not have room for equitable security.

This was the biggest shock for Russia's affluent urban population critical of the Kremlin's policies during two decades of stability and Putin's rule. A whole new class of rich professionals and businessmen who made their fortunes through entrepreneurial efforts and relocated their families to EU countries for the education of their children were deprived of their bank accounts and property by the democratic Western governments in the garb of anti-Russian sanctions.

It was a trauma for the pro-West liberals when the consumer-oriented multinationals like McDonald's and Coca-Cola quit Russia for its invasion of Ukraine.

McDonald's opened its first fast fast-food restaurant in Moscow in January 1990. This was seen as Communist Soviet Union's tryst with capitalism. But

closed down its 847 restaurants across Russia in March 2022.

However, on Russia's National Day, June 12 its new owners reopened the chain of restaurants under a new brand: "Vkusno - i Tochka!" (Tasty and that's it!). This ended Russia's affair with the western-style free-market experiment. This also opened huge opportunities for businesses from "friendly" countries including India, which did not subscribe to the US-led western sanctions.

## "PRIVILEGED" STRATEGIC PARTNERSHIP

When Atal Bihari Vajpayee was the Prime minister, India and Russia signed the 'declaration of strategic partnership' during President Vladimir Putin's maiden visit to India in October 2000. Subsequently, "special" and "privileged" adjectives were added to it. This seemed more like a PR stunt. At that time, this may have looked more like a PR stunt, but today New Delhi's actions in the aftermath of Russia's Ukraine campaign not only reflect its policy of strategic autonomy also the depth of its ties with Moscow in areas like defence, atomic energy, and space cooperation.

Ever since the beginning of the Ukraine crisis, India is not only sourcing crude, coal, chemicals, and fertilisers in large quantities from Russia but also providing safety certificates to Russian oil tankers. This is raising hackles in the West and China who have been spreading lies about India heading to again become an Anglo-Saxon colony.

According to a message posted by "Brief"- an anti-Kremlin Telegram channel:

India has become the main partner of the Kremlin. Even if the public opinion of Europe and America is outraged, the official authorities are more likely to agree with such a construction. The transformation of India into Russia's main strategic partner is extremely unnerving for Beijing.

"China has been thinking for too long about how to fit into the new model - India is ahead. It is still difficult to say how much Russian-Chinese relations have suffered. But Moscow is unhappy with Beijing's caution, and Beijing believes that Russia is bluffing. President Xi feels cheated and PM Modi is delighted. Washington believes that Indian contacts are manageable, and Russia's focus on Delhi takes Russia out of the Chinese orbit and increases the tension."

Talking to an online meeting with BRICS business representatives ahead of the virtual summit under the Chinese rotating presidency, President Putin revealed that negotiations are underway with Indian chain stores to open shops in Russia. The Russian market opens immense opportunities for countries that have not joined anti-Moscow sanctions. Turkey and Israel, despite being close Washington allies, have refused to join the sanctions and have already jump-started to grab the opportunities, which India lost after the Soviet collapse.

**Defence Minister Rajnath Singh with his Russian counterpart Sergey Shoigu**

MCDONALD'S OPENED ITS FIRST FAST FAST-FOOD RESTAURANT IN MOSCOW IN JANUARY 1990. THIS WAS SEEN AS COMMUNIST SOVIET UNION'S TRYST WITH CAPITALISM. BUT JUST 12 YEARS LATER, CLOSED DOWN ITS 847 RESTAURANTS ACROSS RUSSIA IN MARCH 2022. THIS ENDED RUSSIA'S AFFAIR WITH THE WESTERN-STYLE FREE-MARKET EXPERIMENT

After yet another expansion of NATO and the admission of Finland and Sweden at the Madrid summit, the West has completed its cordon sanitaire of Russia in the East and a new Iron curtain is being put in place.

The NATO Madrid summit had invited leaders of Australia, Japan, South Korea, and New Zealand in a push towards its expansion in the Indo-Pacific to meet the Chinese challenge.

But the resurrection of colonial construct in the Indo-Pacific is a challenge for India as it makes the much-hyped "Quad" redundant for Washington. The great Indian and Chinese civilisations had coexisted for thousands of years and they would have to find modus vivendi for peaceful competition and coexistence to avert re-colonisation due to the "divide and rule" policy of our past colonial rulers.

*- The writer is a Moscow-based independent analyst. Views are personal.*

# COLLINS AEROSPACE: ALL GEARED TO MEET GLOBAL DEMANDS

A leader in APNT solutions for ground platforms, Collins has delivered more than 10,000 navigation systems to military armed forced around the world. It has the extensive capabilities, comprehensive portfolio and broad expertise to solve customers' toughest challenges and to meet the demands of a rapidly evolving global market

Collins Aerospace, a Raytheon Technologies business, which is a leader in technologically advanced and intelligent solutions for the global aerospace and defence industry recently demonstrated a Unified Network that achieved the range and scale required to support the US Army modernisation and the Joint All-Domain Command and Control (JADC2) initiatives for joint and coalition forces.

This was conducted as part of the recent Experimental Demonstration Gateway Exercise 2022 (EDGE 22) excursion at the Dugway Proving Grounds in Utah, USA. The JADC2 is the US Department of Defence's (DOD's) concept to connect sensors from all of the military services—Air Force, Army, Marine Corps, Navy, and Space Force—into a single network.

The demonstration created a Unified Command and Control Network leveraging ground and air platforms to connect multiple brigade combat teams and division assets separated by up to 365 kilometres in rugged terrain. An advanced tactical data link, mesh network and intelligent gateways facilitated the integrated network.

The intelligent gateway included a cross-domain solution that enabled multiple levels of security across the networks, a capability providing division Commanders and coalition partners access to a common operational picture to enhance situational awareness and make informed split-second decisions.

"The warfighter's most strategic asset is a Unified Network as it provides actionable data anywhere within the multi-domain battlespace and brings together commanders in real time to coordinate mission operations," said Elaine Bitonti, vice president, JADC2 Demonstration and Experimentation for Collins Aerospace.

Collins Aerospace has the extensive capabilities, comprehensive portfolio and broad expertise to solve customers' toughest challenges and to meet the demands of a rapidly evolving global market.

In the recent Eurosatory 2022 in Paris, the company's next generation software-defined airborne communication system – ARC 210 Gen6 – was authorised for delivery to Five Eye and NATO nations. The world's most advanced airborne radio in the market features the latest anti-jam technology, satellite capability (MUOS), embedded high-power output, and the latest modernized cryptology for enhanced situational awareness

and seamless communications in challenging and contested environments.

The ARC-210 Gen6 integrates a next-generation networking capability, and variants can be reprogrammed and customized as needed without sacrificing performance or security. It is now available through Foreign Military Sales (FMS) to authorized countries.

Collins' international variant of this architecture — the AR-1500 — is deployed across the globe with customers in Europe and the Asia-Pacific region. Fully software defined, the AR-1500 provides the same frequency range and RF performance as the ARC-210 Gen6, but with a selection of waveforms and capabilities unique to the direct commercial sale (DCS) market, including electronic protection and embedded cryptography.

"The ARC-210 family of radios has enabled millions of critical messages to be exchanged for more than 25 years, providing U.S. and allied military forces with reliable and secure communications when it's most essential," said Ryan Bunge, vice president and general manager, Communication, Navigation and Guidance Solutions for Collins Aerospace.

At Eurosatory 2022, Collins Aerospace introduced NavHub™-200M, the first non-ITAR vehicular navigation system for the international market compatible with Military Code (M-Code) receiver technology. NavHub-200M's improved message formats and signal modulation techniques will ensure faster and more accurate performance for ground vehicles on the connected battlespace. NavHub-200M provides Assured Positioning, Navigation and Timing (APNT) capabilities while improving overall resistance to existing and emerging threats to Global Positioning Systems (GPS), such as jamming and spoofing.

NavHub-200M

ARC-210 GEN6

"With GPS-based Selective Availability Anti-Spoofing Module (SAASM) receivers set to become obsolete, it is critical that M-Code receiver technology is made available to ground forces around the world as quickly as possible so they can trust that the signals they receive in a fast-moving, hostile environment are accurate and actionable," said Ryan Bunge, vice president and general manager, Communication, Navigation and Guidance Solutions for Collins Aerospace. "Our NavHub-200M provides an improved resistance to jamming and interference, as well as advanced security features to prevent unauthorized access or exploitation."

NavHub-200M also includes the open interface standards and sensor fusion capabilities required for a Global Navigation Satellite System (GNSS) upgrade path, such as that for Europe's Galileo constellation, as well as interfacing with key vehicle sensors such as the inertial measurement unit (IMU) and odometer, among others.

Collins, a leader in APNT solutions for ground platforms, has delivered more than 10,000 navigation systems to military armed forced around the world.

"THE WARFIGHTER'S MOST STRATEGIC ASSET IS A UNIFIED NETWORK AS IT PROVIDES ACTIONABLE DATA ANYWHERE WITHIN THE MULTI-DOMAIN BATTLESPACE AND BRINGS TOGETHER COMMANDERS IN REAL TIME TO COORDINATE MISSION OPERATIONS"

**Elaine Bitonti,** Vice President, JADC2 Demonstration and Experimentation for Collins Aerospace


# EUROSATORY 2022: WEAPONRY INDUSTRY TRADE FAIR IN PARIS

More than 1100 exhibitors from over 50 countries showcased their products in Eurosatory 2022. It provided a platform to interact with companies from other nations to explore the market and collaborate on joint ventures. Over 20 companies from India displayed their products at the biennial event

By **SRI KRISHNA**

The Eurosatory 2022 provided a large platform for those in the weapons industry around the world to showcase their wares over five days from June 13 to 17 in Paris. The biennial event saw over 20 companies from India displaying their products as it gave them an opportunity to not only showcase their wares but also update themselves on the latest in the defence and security industry.

The exhibition was held in the Paris-Nord Villepinte Exhibition Centre, with the participation of 24 national pavilions and over 1100 exhibitors from more than 50 countries showcasing their products. It provided a forum wherein they interacted with companies from other nations to explore the market and collaborate on joint ventures. Indian companies were not far behind. "The government's Atmanirbhar Bharat scheme is very important for us. We are developing products for not only the Indian armed forces but also for sale around the world," said Alok Shriram, senior managing director of the Shriram group.

## HUGE PARTICIPATION

In the last exhibition held in 2018, over 1800 exhibitors displayed their products and more than 57,000 people visited the exhibition. This prestigious show, which is organised by COGES in partnership with the French Ministry of Defence, provides an opportunity for companies worldwide to display their wares and also have interaction with other companies. The pandemic led to the cancellation of the 2020 exhibition.

With huge participation by the Defence and Security industries from all over the world, the exhibition provided an opportunity

for visitors to get a glimpse of the high level of equipment and live demonstration of the latest gadgets.

Besides the exhibits of the participants, the daily interaction over the duration of the show through conferences with high-level decision-makers, technical and operational experts from different countries and international bodies provided an opportunity to know the latest in the industry.

The Eurosatory 2022 is dedicated to the land and airland defence and security sectors and is the world's number one of its kind. An international and exhaustive exhibition, it presents the vast majority of countries that have a defence and security industry. Eurosatory saw the participation of professionals who represented a high-value network. The fair enabled visitors to see live demonstrations of the units of the armed or security forces, highlighting the control by the operational technologies developed by the industry.

The participants' satisfaction is an absolute priority for the event's organisers. They carefully provide the participants with multiple services for their businesses such as networking tools for individuals, business meetings for companies, and business consulting.

## ENTHUSIASTIC PARTICIPANTS

There was much enthusiasm among the Indian participants. "Europe is one of the primary areas for the sale of our products and we have partners in the UK, Spain and Germany," said AR Muthuraman, director of Sales and Marketing in Turbo-India Interconnect Solution, which manufactures Industrial Connectors used by military and police forces worldwide. The Eurosatory provided a major platform for the company to expand its market in Europe, he said.

Another Indian company that participated in the exhibition was the Mumbai-based Entremonde Polycoaters Limited. It manufactures coated and laminated fabrics and also makes Aircraft Emergency Escape Slide, Waterproof Breathable Fabric, Camouflage Products, Reflective Nylon Fabric, Navy Awnings, Truck Covers, Bio Gas Balloons, Fumigation Covers, Shipping Container Covers, Machinery Covers and Sheds. Chief Operating Officer Kiran Joshi said the company also makes textile products for the defence forces and they have about 25 products with many of them developed for the first time in collaboration with DRDO. The Eurosatory 2022 gave the company an opportunity to display their products and also to explore the market for collaboration in this sector.

"This time we are displaying one of our signature management products, which are camouflage jackets, and boots to protect the



# EVENT REPORT

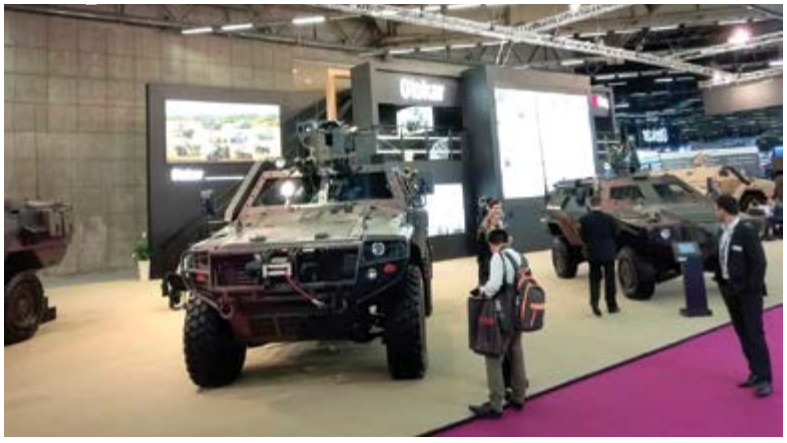

army from various threats like radars and thermal cameras," Joshi said.

## TECHNOLOGICAL CLUSTERS

The exhibition had six technological clusters allowing exhibitors to gather around common themes such as CBRN, drones and robotics, embedded electronics, training and simulation.

A new 2022 area particularly stood out was the new demonstrator 'HELPED by COGES Events' - Humanitarian Emergency Logistic Project and Eco-Development, which highlighted the response to crisis issues. This was presented for the first time with the capability package bringing together industrial systems and highly-mature civilian innovations. It sought to demonstrate the ability to provide a complete and rapid solution for assistance and support in the management of multiple crises.

Eurosatory 2022 also gave a significant boost to start-ups by allowing them to present their solutions alongside big companies. An area of more than 1000 sq metres was dedicated to



French and International start-ups in the Eurosatory LAB and the Gicat's stand.

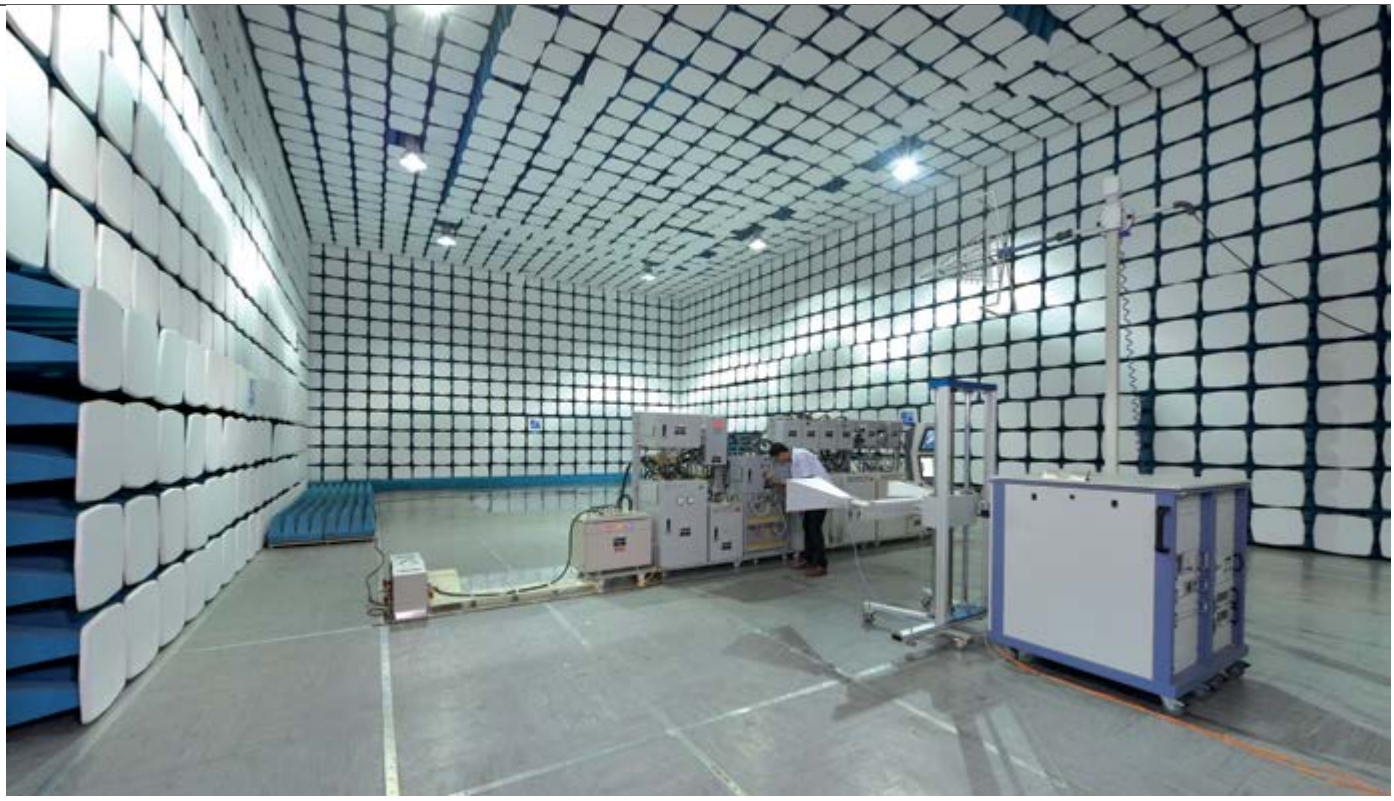
Another major Indian participant was the DCM Shriram Industries Ltd (DSIL), which has forayed into defence equipment manufacturing with the roll-out of Zebu, a light bulletproof vehicle (LBPV) capable of operating across various terrains. The LBPV had been indigenously designed, tested and developed for use by the defence and para-military forces in their strategic activities against foreign aggressors as well as internal insurgents, the company said.

## ARMOURED VEHICLES

Alok Shriram said, "We found in the Indian armed forces and the police forces, there was a huge requirement for a cost-effective armoured vehicle, which will protect our protectors and that is our motto for armoured vehicles. We have a partnership with Israel and they help us with our design and upgrade."

His son Rudra Shriram, who is DCM's Joint President, has been focusing on drones, which is now a growing industry in India and the world. "We have had footfalls in our stall to see our product from various countries ranging from Africa, South America as well as Asia," he said.

*- The writer is a senior journalist and media consultant. The views expressed are of the writer and do not necessarily reflect the views of **Raksha Anirveda***



# EMI /EMC TESTING AS PER MIL-STD-461

MIL-STD-461 specifies the requirements for the control of electromagnetic interference characteristics (emissions and susceptibility) of electronic, electrical, and electromechanical equipment/system/subsystems (Rack mount/Wall mount/Floor standing) designed for various agencies of the Department of Defence (DoD). MIL-STD-461 has been an active document since 1967 and has undergone several revisions over the years due to changes in Electromagnetic Environment (EME) caused by the rapidly increasing use of electronics and advancements in technology.

ERDA has vast EMIEMC testing experience of different electrical and electronics products made for defence application like control panels for Missile launcher , Missile controller, Radar System, Flood detection for Navy application & Motors for Naval application.

ERDA is fully equipped, capable and accredited as per ISO/IEC 17025: 2017 to perform testing as per E & F revisions of MIL-STD-461. ERDA is equipped with 10 meter Semi Anechoic chamber having 3 ton weight bearing capacity to accommodate big & bulky equipment. In-house testing of equipment, in excess of 20 feet in length and weighing up to 3 tons is already performed.

## Tests undertaken at ERDA as per MIL-STD-461 Revision E & F

| TEST NAME | TEST DESCRIPTION |
|---|---|
| CE 101 | Conducted Emissions, Power Leads,30 Hz to 10 kHz |
| CE102 | Conducted Emissions, Power Leads,10 kHz to 10 MHz |
| CS101 | Conducted Susceptibility, Power Leads,30 Hz to 150 kHz |
| CS114 | Conducted Susceptibility, Bulk Cable Injection, 10 kHz to 200 MHz |
| CS115 | Conducted Susceptibility, Bulk Cable Injection, Impulse Excitation |
| CS116 | Conducted Susceptibility, Damped Sinusoidal Transients, Cables and Power Leads,10 kHz to 100 MHz |
| RE101 | Radiated Emissions, Magnetic Field,30 Hz to 100 kHz |
| RE102 | Radiated Emissions, Electric Field,10 kHz to 18 GHz |
| RS101 | Radiated Susceptibility, Magnetic Field,30 Hz to 100 kHz |
| RS103 | Radiated Susceptibility, Electric Field,2 MHz to 18 GHz (up to 50V/M) |

BUSINESS INSIGHT

# THE FUTURE OF CBRN DETECTION SYSTEMS

A modern, effective CBRN detection system is about creating an integrated system that provides effective detection in any scenario. It consists of hardware, software and traditional skills such as training. At the same time, embracing many emerging skills is a must to achieve a new layer of safety and securing, helping to make the world a safer place

By **VIKRANT TRILOKEKAR**

Traditionally, CBRN weapons have been manufactured for use on the battlefield. In recent years, this threat has changed from CBRN weapons to include Toxic Industrial Chemicals (TICs). The threats posed by these materials has shifted from military use to assassinations or release into a local population - this changing threat requires cutting edge detection systems. Specialised companies, such as Smiths Detection, can assist in the development of CBRN detection systems to help defend against them.

**How has the CBRN threat changed?**

Recent years has seen a rapid evolution of the CBRN threat to militaries and civilian populations. Part of these changes has been the broadening of threats and the way that they can manifest in either war or peace. There are well-establish detectors that mitigate risks from classic CBRN weapons, like the Smiths Detection Lightweight Chemical Detector (LCD) or the BioFlash Biological Detector. Such detectors have been used in a wide variety of missions and are proven tools relied upon by defence and emergency agencies around the world. These instruments are frequently updated and enhanced in response to the continued development of new Chemical & Biological Warfare Agents. Adding enhancements such as the XID adapter to the LCD to increase its range of detection is one such example. XID - eXtended IDentification; an accessory to the LCD that turns it into a trace residue detection system, and expands the chemical detection range to include explosives, Chemical Warfare Agents (CWAs), and narcotics.

Recent years has seen a rise in the use of CBRN weapons to commit assassinations and terrorist organisations have long been interested in developing and using them. This brings CBRN weapons into the civilian space which needs a military/civilian response.

Also, due to increasing industrialisation, there is a prevalence of TICs (Toxic Industrial Chemicals) at industrial sites which are often located close to local populations. This brings an increased risk of an accidental or deliberate release and the ensuing casualties and chaos. This means that both militaries and first responders need to be educated, trained and equipped to deal with TIC threats.

Finally, the development of the Internet of Things and Artificial Intelligence amongst other technological advances makes the development of novel CBRN weapons easier and increasingly challenging to detect. Consequently, responders need to be equipped and trained with the best possible CBRN systems, not just detectors, that allow

for greater understanding and situational awareness of the threat.

**What does this mean for CBRN detection systems?**

There is and always will be a requirement for world-class CBRN detectors. Defence and civilian defenders need to implement integrated systems that encompass detection through to threat management to address changing threats. At the core of any CBRN detection system are high-performance detectors. Ideally, one detector that is employable in a range of roles such as body-worn, vehicle, UAV or UGS mounted. These detectors need to be upgradable to meet future threats or specific requirements and supported by an experienced partner such as Smiths Detection.

Detectors need to be integrated into a network that allows their information to be quickly shared with a warning and reporting capability, such as the UrbanAware programme, to provide detailed information on the threat. Accurate threat modelling based on topography, terrain-use and weather data will provide a commander with the necessary information to make correct and timely decisions.

Crucially, any system needs to share information in real-time.

**LCD 4 with XID Adapter**

Effective situational awareness is central to countering threats effectively. It will lower the secondary effects of CBRN weapons and TICs by reducing the physiological and psychological burden on personnel by keeping them out of protective equipment for longer or even totally.

The ability to create a system that does all this requires a solutions provider, like Smiths Detection, which has the depth of knowledge and experience to deliver complete end-to-end systems.

**Challenges to creating a modern CBRN detection system**

In creating a modern CBRN detection system there are many hurdles. Some of these are CBRN specific but others are generic to the way that organisations operate effectively.

CBRN-specific examples include procuring the best systems in good time. It is highly unlikely that any one nation will produce the best detectors. Collaborating with companies to acquire or develop such technology is necessary. CBRN products are manufactured to meet demand, forward planning will secure the best detection systems before a crisis emerges and everyone suddenly wants them. Creating, equipping and training the right CBRN forces including generalists competent to operate in such an environment is also necessary.

There are many non CBRN-related factors that are important for enabling effective future CBRN detection systems. For example, having an open mind. Who would have created the Salisbury poisonings or COVID-19 as credible exercise scenarios? Linked to this is incorporating diverse and critical thinking and creating a culture that understands and is comfortable with complexity. Well trained specialists and generalists who can think creatively provide solutions to highly novel problems.

Finally, effective exercising and rehearsing is important as it will make any response easier. Preparing a response is made easier when highly effective modelling and simulation allows for many of the points above to be addressed. The UrbanAware software allows scenarios to be rehearsed, possibilities examined, and plans drawn up which form the start point for any real response. Such systems will assist civilian or military personnel in preparing a response to a CBRN or TIC threat.

**BioFlash -Biological Detector**

## CONCLUSION

A modern, effect CBRN detection system is so much more than just the latest detectors. It is about creating an integrated system that provides effective detection in any scenario. Such a system consists of hardware, software and traditional skills such as training. But there are many emerging skills that should be truly embraced to be genuinely effective. Any adversary will not use CBRN weapons because they believe they can get away with it. Partnering with an expert, such as Smiths Detection will help defenders and civil agencies achieve a new layer of safety and securing, helping to make the world a safer place.

*- The writer is Managing Director -India, Smiths Detection. The views expressed are of the writer and do not necessarily reflect the views of* ***Raksha Anirveda***

RECENT YEARS HAS SEEN A RISE IN THE USE OF CBRN WEAPONS TO COMMIT ASSASSINATIONS AND TERRORIST ORGANISATIONS HAVE LONG BEEN INTERESTED IN DEVELOPING AND USING THEM. THIS BRINGS CBRN WEAPONS INTO THE CIVILIAN SPACE WHICH NEEDS A MILITARY/ CIVILIAN RESPONSE

ISRAEL DIARY

Israel is making efforts to develop autonomous combat ground vehicles as well as upgrading some manned armoured platforms. One good example of the main battle tank that is being upgraded almost continuously is the Israeli Merkava 4. The Indian technology companies are also being involved in the development of combat vehicles

# ISRAELI MERKAVA MBT: AN IDEAL WAR MACHINE

By **ARIE EGOZI**

The Israeli ministry of defence is leading an effort to involve Indian companies in the technologies that are being used to develop new combat vehicles and advanced versions of main battle tanks. The new technologies are being demonstrated in the Israeli Merkava main battle tank and in some manned and unmanned ground-combat vehicles. The last to be unveiled is the robotic unmanned vehicle (M-RCV Medium Robotic Combat Vehicle) developed by the ministry's Directorate of Defence Research and Development (DDR&D), the Tank and APC Directorate, and the Israeli security industries.

The vehicle includes a new robotic platform type BLR-2 made by Israeli company BL, a 30 mm autonomous turret developed by the Tank and APC Directorate for the 'Eitan' APC, Elbit's 'Iron Fist' Active Protection System, fire control and mission management systems. It also has a robotic autonomous kit, in addition to the situation-awareness systems. The vehicle also features a capsuled drone for the forward reconnaissance missions and a passive sensing kit developed by Elbit Systems and Foresight.

The technological demonstrator, led by the DDR&D and the Tank and APC Directorate, integrates a number of cutting-edge technologies, including advanced manoeuvring capabilities, with the ability to carry heavy and varied mission loads, and a built-in system for transporting and receiving UAVs. The vehicle will also incorporate Sights, an IAI missile launcher, and 'Spike' missiles of Rafael Advanced Defense Systems. The M-RCV's capabilities include a highly autonomous solution for the forward reconnaissance and controlled lethality in all-terrain conditions. It is operational during the day and night in all-weather scenarios, while emphasising operational effectiveness, simplicity, minimum operator intervention, and integration into heterogeneous unmanned arrays.

The system was developed as part of the autonomous battlefield concept led in the DDR&D in collaboration with the Tank and APC Directorate while implementing an open architecture for integrating future capabilities and integrating the robot alongside other tools and capabilities. The system is a joint product of many years of investment by the DDR&D and the Tank and APC Directorate and is expected to start field tests during 2023 in representative scenarios.

Trophy on Merkava

## MBT UPGRADATION: MERKAVA 4

While there is an Israeli effort to develop autonomous combat ground vehicles, the upgrade of some manned armoured platforms continues. The destroyed Russian tanks in Ukraine have not surprised the Israeli experts. It was known to them and to other experts around the world that while western countries are upgrading their tanks, Moscow decided that what they have is enough. The reality is totally different. The blown-off tops of Russian tanks are just the latest sign that Russia's invasion of Ukraine is not going smoothly. An Israeli source said that while in the world tanks are getting more and more upgrades and add-ons, the Russians did almost nothing.

One good example of the main battle tank that is being upgraded almost continuously is the Israeli Merkava 4. Not all the latest upgrades of the Merkava 4 can be disclosed but it is clear that the new version will have enhanced systems that will allow automatic fire against threats. According to defence sources, the upgraded Merkava 4 'Barak' (Lightning) will be equipped with an improved APS system and a commander helmet that will prioritise the relevant data gathered by the sensors of the tank and other sources in the battle area. The importance of an effective APS system became clear when we saw dozens of Russian-made tanks destroyed by missiles launched by the Ukraine army. The new version will also have a system that will automatically fire on targets that pose danger to the tank, like units that launch anti-tank missiles.

An advanced main computer will give the tank's crew the ability to focus on the most relevant targets while sharing the data with other tanks and other units on the ground and in the air.

Unmanned M-RCV System

Some of the new systems to be integrated into 'Barak' are based on the combat suit developed by Israel aerospace industries (IAI). These systems were developed for an advanced armoured fighting vehicle but some will be modified for use on the new version of Merkava 4. The 'Iron Vision' commander helmet will have, according to sources, the capability to get a 360-degree view and the combat data from the various sensors. The system has the ability to locate and destroy time-sensitive targets with small footprints, through quick acquisition and effective engagement of targets, sources said.

## A MILESTONE IN THE GROUND BATTLE

This selection of IAI to fully develop the Israel defence forces' next-generation fighting vehicle is also a milestone in the new concept Israel is developing as related to ground fighting. IAI has been selected by Israel's MoD as the prime contractor and integrator for developing the concept and technologies for the future Armoured Fighting Vehicle for the IDF – the Carmel.

IAI has demonstrated a two-man, closed-hatches armoured fighting vehicle (AFV). IAI has developed and proven a combat concept in which an AFV, with closed hatches, is operated by a two-man crew and can successfully cope with existing and future challenges on the battlefield. This solution is based on automatic and autonomous systems that complement the two-man team, and operate the central subsystems – the vehicles' mission planning and management, situational awareness, driving and lethality. These capabilities allow the team to define, supervise and interfere only when there is a necessity, and enable to cover a wider area of concern while effectively meeting the challenges faced by the manoeuvring forces. The system has the ability to locate and destroy time-sensitive targets with small footprints, through

THE DESTROYED RUSSIAN TANKS IN UKRAINE HAVE NOT SURPRISED THE ISRAELI EXPERTS. IT WAS KNOWN TO THEM THAT THE WESTERN COUNTRIES ARE UPGRADING THEIR TANKS, WHILE MOSCOW DECIDED THAT WHAT THEY HAVE IS ENOUGH

# ISRAEL DIARY

Prototype of IAI Carmel

THE CARMEL PLATFORM PROPOSED BY IAI COMBINES A PANORAMIC DISPLAY, INDIVIDUAL CONTROL SCREENS, AND A CONTROL STICK SIMILAR TO A GAMING CONSOLE OR 'XBOX JOYSTICK'

quick acquisition and effective engagement of targets.

Aside from IAI, Elbit Systems and Rafael also proposed their concepts that were also tested. The competition was part of an across-the-table effort to shape the future ground-battle ground.

These sought-after technologies can be summed up in one sentence - give our combat vehicles capabilities that serve the new concept of fast-moving ground forces equipped with multi-sensors, and multi-weapon systems to achieve control of the battleground quickly and decisively. The development of the systems that will turn each combat vehicle into a real 'war machine'.

The operational integrations will include the 'cockpit' systems that have been developed by IAI and additional weapon systems like the Rafael 'Spike' anti-tank missiles and the company's automatic weapon stations.

The Israeli MoD is trying to bring the US and Indian armies to become partners in the programme. It can be said that the prototypes that were unveiled last year were based on the lessons of the Second Lebanon War and carry many highly advanced systems. The main idea is to enable the two-man crew to operate along with the battle from inside the protected vehicle, to protect themselves in urban warfare, especially from snipers and anti-tank missiles.

The operation will be based on the array of sensors that the vehicle will carry.

An optional third team member will be capable of operating robotic ground vehicles in areas with very high degree of danger even to armoured vehicles.

The plan is to build a Hybrid vehicle equipped with diesel and electric motors at the same time. Electric propulsion will allow for quieter short-distance travel but is essential as a new source of power for a new weapon that may be integrated into the project: a high-intensity laser. "We have been investing in the last few years, and especially in the past year, to develop a powerful laser for a variety of uses, and it may be integrated into Carmel," said Brigadier General Yaniv Rotem, head of R&D at the ministry of defence said during the competition. The prototypes presented by the industries differ slightly in the nature of their operation.

Each industry was asked to develop its own technological concept that would transform and upgrade the interior part of the IDF's combat vehicles to an advanced cockpit, like the ones used in fighter aircraft. The challenge: proving the feasibility of two soldiers conducting closed-hatch operations and integrating technological capabilities that would enhance mission efficiency for the IDF's manoeuvring forces. The proposed suits made by the three companies have been installed on M-113 APC's that are used for demonstration.

The advanced cockpit integrates autonomous capabilities (manoeuvring, detecting targets, defence). In addition, the combat soldier enjoys multi-sensor fusion and 360-degree vision, high connectivity, and situational awareness. Ultimately, the soldiers are only required to make decisions that the mechanism cannot (yet) make by itself.

The industries took the challenge head-on, employing experts in the field and introducing advanced technological infrastructure in the process. Each industry tested its solution for a period of a week, within a series of complex operational scenarios. A team of experts from the MoD and the IDF evaluated the three concepts in accordance with predetermined criteria.

## THE CARMEL PLATFORM

The technological platforms proposed for the future AFV, employ a combination of

advanced sensors, VR and AR mechanisms, AI technology to process information, and more.

IAI presented a platform based on the company's family of autonomous systems and robotic tools, which are currently in wide operational use in Israel and around the world. The Carmel platform proposed by IAI combines a panoramic display, individual control screens, and a control stick similar to a gaming console or 'Xbox Joystick'.

The autonomous capabilities in the combat vehicle are operated by a central, autonomous system, which integrates the various components in the platform and assists the human operator in processing information, focusing on critical threats, and making effective real-time decisions. The platform is based on AI technology to detect threats, enabling effective target engagement and weapon system management as well as autonomous driving in various terrains.

According to IAI, the technologies package offered by the company is aimed mainly at supplying the two men crew with the best situational awareness. "And after that is achieved to choose the best weapon to kill it. You can see the commander of the ground vehicles as a safety button. The system can shoot automatically but for now, the human in the vehicle will have to release the safety button," a company official said.

While the upgraded Merkava MBT and the Carmel are two separate programmes, many technologies are used in both and the similarities point in one direction – give your heavy and light combat ground platforms capabilities that will enable the fighters to kill the enemy as fast as possible.

*–The writer is an Israel-based freelance journalist. The views expressed are personal and do not necessarily reflect the views of* ***Raksha Anirveda***

# IAI AWARDED MULTI-MILLION DOLLAR DEAL IN ASIA FOR SCORPIO-SP JAMMER PODS WITH AESA TECHNOLOGY

**Tel Aviv:** Israel Aerospace Industries (IAI) has been awarded a new multi-million-dollar deal for the purchase of Scorpius-SP Airborne Self Protection Jammer pods with Active Electronic Scanned Array (AESA) technology (ELL-8222SB), for an air force in Asia. Scorpius-SP is based on cutting-edge AESA technology with multi-beam operation – the ability to simultaneously detect and suppress multiple threats in different directions around the aircraft. AESA multi-beam technology provides exceptionally high sensitivity, allowing the system to detect advanced threats including Low Probability of Intercept (LPI) Radar, and very high jamming power for effective suppression of the targets. These capabilities represent a breakthrough in electronic protection and attack, creating the most effective airborne self-protection system available today. Scorpius-SP utilises Digital Radio Frequency Memory (DRFM) and a range of sophisticated ECM techniques, providing protection against all types of Air-to-Air (A/A) and Surface-to-Air (S/A) threats in a dense radar-guided weapons environment. Based on IAI-ELTA's best-selling ELL-8222 pod configuration, this compact, lightweight, and aerodynamic pod is similar in contour to A/A missiles and may be installed on outer wing stations of fighters and other aircraft. The jammer significantly enhances aircraft survivability and mission success in today's highly challenging threat environment.

The technology behind Scorpius-SP is based on IAI-ELTA's decades of development and operational experience in AESA technology. In recent years, IAI-ELTA successfully developed AESA to meet the challenging requirements in the domain of electronic warfare (EW), culminating in the Scorpius family of systems that represent the future of EW. Scorpius-SP is the implementation of Scorpius technology for aerial self-protection. Other Scorpius systems include Scorpius-G for ground-based electronic defence, Scorpius-N for naval EW, Scorpius-T for aircrews' live training, and Scorpius-SJ for aerial support and stand-off jamming.

BUSINESS PROFILE

# AL TARIQ – THE ULTIMATE SOLUTION

The AL TARIQ's mission-proven proven combat effectiveness, augmented by its unique modularity and dynamic flight profiles provides the user with a superior LR-PGM family that is simply unrivalled

EDGE is a UAE-headquartered advanced technology group for defence and beyond, consolidating more than 20 entities across four core clusters. One of the top 25 military contractors in the world, the entities under EDGE are grouped according to their specialised domains, all of which are complementary to each other.

AL TARIQ is part of the Missiles & Weapons cluster within EDGE. The company is a high technology manufacturer of Precision-Guided Munitions (PGMs) solutions, developing systems to complement the local content in the UAE, while enabling expansion of the UAE defence capabilities.

The company AL TARIQ designs and produces the AL TARIQ range of long range PGMs (LR-PGM) – a modular family of all-weather, day/night, high precision munitions converting unguided aerial weapons into smart, longer-range focused munitions. The modular nature of the AL TARIQ system is unmatched by any PGM currently available worldwide.

The AL TARIQ family consists of two distinct standoff range derivatives, the AL TARIQ-S (Standard Range) and AL TARIQ-LR (Long Range) with a variety of optional seekers, providing a high degree of operational mission flexibility to the warfighter. The addition of the wing-kit on the AL TARIQ-S version, allows the user to increase the standoff range from 45 km to 120 km. The AL TARIQ LR-PGM is designed for the Mk 81, Mk 82 and Mk 83 aerial bombs. The system can also be integrated on the 250kg and 450 kg High Speed Low Drag (HSLD) payloads. A penetration payload for engaging hardened installations can also be

THE COMPANY AL TARIQ DESIGNS AND PRODUCES THE AL TARIQ RANGE OF LONG RANGE PGMS (LR-PGM) – A MODULAR FAMILY OF ALL-WEATHER, DAY/NIGHT, HIGH PRECISION MUNITIONS CONVERTING UNGUIDED AERIAL WEAPONS INTO SMART, LONGER-RANGE FOCUSED MUNITIONS. THE MODULAR NATURE OF THE AL TARIQ SYSTEM IS UNMATCHED BY ANY PGM CURRENTLY AVAILABLE WORLDWIDE

integrated, depending on the user's requirement.

The Block II AL TARIQ LR-PGM also offers the user the option of a variety of seekers, enhancing terminal guidance ensuring a very high degree of accuracy. The system is integrated with either a GNSS/INS, or a GNSS/INS/Semi-Active Laser (SAL) or GNSS/INS/Imaging Infrared (IIR) seeker (with Automatic Target Recognition). Added to these high accuracy seeker solutions is the integration of a GNSS Anti-Jamming solution and a Height-of-Burst Sensor (HOBS), permitting the weapons to utilize airburst applications capable of neutralising strategic infrastructure such as radar installations and air-defence batteries.

Platform integration solutions allow for either a stand-alone wireless solution or a fully integrated digital solution on any aircraft type. Furthermore, the AL TARIQ system also offers a conversion to integrate on a bomb with 10" suspension lug spacing, allowing integration onto Russian airframes.

The 'Make in India campaign is supported by EDGE due to the traditionally strategic relationship between the UAE and India. AL TARIQ is currently in discussions with local Indian manufacturers as part of its commitment to support the Indian defence sector.

The capability to engage hard and soft targets, whether stationary, moving or relocatable, allows AL TARIQ to be utilized in the modern battlefield. The AL TARIQ's mission-proven proven combat effectiveness, augmented by its unique modularity and dynamic flight profiles provides the user with a superior LR-PGM family that is simply unrivalled.


# MOIAT, EDB, EDGE GROUP SIGN JOINT AGREEMENT TO BOOST MANUFACTURING IN DEFENSE SECTOR

Abu Dhabi - UAE: The UAE Ministry of Industry and Advanced Technology (MoIAT), Emirates Development Bank (EDB), and EDGE Group, have signed a mutual agreement to support the development of manufacturing at one of the world's top 25 advanced technology groups for defence. The agreement is in line with the UAE's Fourth Industrial Revolution program, Industry 4.0, and aims to support growth in the defense sector, one of the key industries of the future. The agreement includes financing of up to AED 1 billion provided by EDB to support and accelerate the industrialisation of EDGE's unique offerings.

The event took place at MoIAT's Make it in the Emirates Forum, being held in Abu Dhabi. The signing ceremony was witnessed by His Excellency Dr Sultan Al Jaber, UAE Minister of Industry and Advanced Technology, Her Excellency Sarah Al Amiri, Minister of State for Advanced Technology, and His Excellency Faisal Al Bannai, Chairman of the Board of Directors, EDGE Group. The agreement was signed by His Excellency Omar Al Suwaidi, Undersecretary of the UAE's Ministry of Industry and Advanced Technology, Mansour AlMulla, Managing Director & CEO, EDGE Group, and Ahmed Al Naqbi, CEO of Emirates Development Bank.

Under the agreement, MoIAT will provide EDGE with a robust roadmap which will reinforce EDGE's position as one of the world's leading and most financially sound suppliers of military hardware and technology. MoIAT will support EDGE to expand global exports of more than 40 cutting-edge domestically manufactured products and solutions, spurred on by several recent wins against major industry players, boosting the group's contribution to in-country value.

EDGE is one of the greatest success stories to have emerged from the UAE's industrial ecosystem. As part of our objective to build a global hub for manufacturing, the Ministry of Industry and Advanced Technology, along with Emirates Development Bank, is committed to supporting partners like EDGE to capitalize on growth opportunities.

With a focus on Autonomous Capabilities, Precision Guided Platforms and Electronic Warfare, alongside its other defense and security capabilities, EDGE continues to collaborate with a diverse set of international partners to co-develop intellectual property (IP) and future products, with an emphasis on SMEs and start-ups. EDGE is adopting advanced Industry 4.0 technologies to create efficient manufacturing processes in all areas of its product development journey and is upskilling and training its workforce in the adoption of these technologies across all its shop floor operations. The forum has brought together over 1,300 delegates, including representatives from leading national companies, manufacturers and investors. It aims to promote the growth of national industries and discuss opportunities for partnership and cooperation in the industrial sector, in addition to presenting opportunities for product localization, redirect the value of purchases into the national economy, and benefit from local purchasing power to develop the industrial sector.

INITIATIVE

# AIDSS, AMITY UNIVERSITY PARTNERS WITH RAKSHA ANIRVEDA FOR STUDENT INTERNSHIP PROGRAMME

The Amity Institute of Defence and Strategic Studies (AIDSS) offers a wide range of subjects at the undergraduate and postgraduate courses as also for the MPhil and PhD programmes on a very contemporary basis

With Defence Studies becoming a 'strategic and critical thinking' tool as an instrumentation of national policy formulation and a vital component in Defence Diplomacy and Military Civil Fusion concept and Strategic Communications, it assumes greater importance in the security calculus of nations. Keeping this in view, Amity University establish more than 25 years ago has transcended qualitative higher learning and education thresholds as one of the most premier academic institutions on the nation, with courses conforming to the NEP 2022, initiated at the undergraduate, postgraduate, MPhil and Doctorate level for students to pursue these subjects to attain scholastic excellence.

The University was founded by Dr Ashok K. Chauhan, Hon'ble Founder President Amity Education Group, Dr Atul Chauhan Chancellor Amity University Uttar Pradesh and Dr Aseem Chauhan, Chancellor Amity University Manesar have leveraged the education standards, on the job learning, upskilling, and online course programmes, which is now ranked as a leading research and innovation driven private university and amongst the top 3% progressive universities of the world. The students graduating from this university have immense scope in a wide spectrum of institutions and in pursuing their career pathways in academics to journalism. There are immense opportunities for them in both Indian and foreign think tanks, media houses, defence industry partnerships, etc.

The University's department for Defence and Strategic Studies, also known as Amity Institute of Defence and Strategic Studies (AIDSS) is headed by Lt Gen (Dr) S. K. Gadeock, AVSM (Retd) who brings in his rich professional military experience and innovative dimension of pedagogy in meaningful measure. The Amity Institute of

Defence and Strategic Studies offers a wide range of subjects at the undergraduate and postgraduate courses as also for the MPhil and PhD programmes on a very contemporary basis.

Recently, Amity Institute of Defence and Strategic Studies organised a month-long internship programme for its undergraduate students. Under this programme, *Raksha Anirveda*, a prospective think tank, an emerging and evolving defence and strategic affairs quarterly magazine provided internship to eight students of AIDSS. The six weeks-long internship programmes focused on helping the students to connect their classroom knowledge with their on-field experience and also trained them to learn new skills, enhancing confidence levels manifold to adapt themselves in a professional environment

Among the think tanks in India where the students could pursue their area of studies are Observer Research Foundation (ORF), Manohar Parrikar Institute of Defence Studies and Analysis (MPIDSA), Centre for Joint Warfare Studies (CENJOWS,) National Maritime Foundation (NMF), Centre for Land Warfare Studies (CLAWS), Centre for Airpower Studies (CAPS) etc. Additionally, the foreign think tanks where students have prospects of joining include Carnegie Foundation, Brookings, Chatham House and Stimson Centre etc.

**The subjects which the students can choose to pursue at AIDSS are: (Give a table presentation to the below details)**

1. Defence and Strategic Studies
2. India's Foreign Policy
3. Industry 4.0 and Defence and Security
4. Modern Strategic Thought Process
5. Peace and Conflict Studies
6. Terrorism and Counter Terrorism
7. Geopolitics and military geography studies
8. UN and New World Order
9. World Powers and New Strategic Alignments
10. International Relations
11. Defence Budget and Economics
12. Military Technology and Warfare Spectrum
13. Diplomacy and International Affairs
14. International Law
15. India's Defence Preparedness
16. India's Military History
17. Maritime Defence and Security
18. Foreign Language and Communication Skills

With the concomitant rapid growth of the electronic media as also digital media along with the burgeoning growth of specialised journals in defence and foreign policy, there is indeed immense scope for the students to pursue a career in defence journalism in their specialised areas. Moreover, the increasing number of exhibitions and expositions on defence, offers an opportunity for the students to interact with leading defence industries and corporate companies focused on weapons and defence equipment and gain an in-depth knowledge of these areas. The future of both the Defence Industrial Corridors is promising and the GOI is giving them all possible infrastructural facilities, communication network systems, FDI from foreign defence collaborators and ease of doing defence business to foster indigenised manufacturing of defence systems contributing exponentially towards 'Atmanirbhar Bharat'.

WITH THE CONCOMITANT RAPID GROWTH OF THE ELECTRONIC MEDIA AS ALSO DIGITAL MEDIA ALONG WITH THE BURGEONING GROWTH OF SPECIALISED JOURNALS IN DEFENCE AND FOREIGN POLICY, THERE IS INDEED IMMENSE SCOPE FOR THE STUDENTS TO PURSUE A CAREER IN DEFENCE JOURNALISM IN THEIR SPECIALISED AREAS.

BUSINESS INITIATIVE

# MODERNISING INDIA'S MILITARY SNIPER PARADIGM TO COUNTER 21ST CENTURY THREATS

Ashbury Defense Group's most interesting core capability is that of a systems integrator, and coordinating-architect of a global consortium of leading small arms equipment manufacturers in support of the Armed Forces. Ashbury's Atmanirbhar Bharat spirit brings more than two decades of small arms engineering, precision ground targeting and military equipment contracting experience supporting conventional ground forces and special operations combat elements

By **RA EDITORIAL DESK**

Nowhere is the true spirit of Atmanirbhar Bharat more prevalent than in India's rapidly expanding and exciting defence small arms manufacturing sector. Industrial small arms and ammunition manufacturing license applications are on the rise surprisingly with both small and large companies. Along with the expected participation of traditional major players in Indian industry, we are seeing true innovation arising from the entrepreneurial ranks of MSME's. This gives rise to increasing public confidence that our Jawans will get the much-needed modern high-quality weapons.

Inspired home-grown entrepreneurs are introducing our Police, Para-military and Military to new small arms designs to meet our modernisation requirements. One such MSME that is taking a very unique approach to the development of specialised precision weapon systems used by snipers is Ashbury Defense Group (India) Pvt. Ltd.


This New Delhi based MSME is just over 18 months old, yet brings more than two decades of small arms engineering, precision ground targeting and military equipment contracting experience supporting conventional ground forces and special operations combat elements. Ashbury's most interesting core capability is that of a systems integrator, and coordinating-architect of a global consortium of leading small arms equipment manufacturers in support of the Armed Forces.

Taking a deeper look at Ashbury Defense India, *Raksha Anirveda* could see that they have strategically partnered with USA based Ashbury International Group Inc. and their small arms technology development company Ashbury Precision Ordnance Manufacturing. Over the past decade Ashbury has been awarded more than 26 patents for precision tactical sniper weapon systems and related combat support equipment. Ashbury is perhaps best known in western military circles for its pioneering work developing integrated laser range finder LRF-GPS, precision ground target geo-location systems for Forward

Observers (FO), Forward Air Controllers (FAC), reconnaissance and snipers; used successfully with devastating effectiveness in the Afghanistan and Iraq wars.

In further conversation with ADGI representatives, it was very much clear that the company sees itself in India as being "engineering agile" with a keen eye to meet the MOD's "L1" sniper rifle acquisition strategies with a focus on exceeding the requirements utilizing the proven principles of "designed for manufacturability" and "engineered to cost". These small arms manufacturing corner stones are inherent in ADGI's entire family of "ISR" India Sniper Rifles (7.62x51mm, .338 Lapua Magnum & .50BMG). Ashbury is meeting the L1 challenge with no-compromise in quality, accuracy, durability or reliability. Their moniker is Trusted to Make It Better! and their former military and small arms industry directors certainly seem committed to that statement.

Ashbury Defense Group (India) possesses a significant small arms technologies portfolio featuring bolt action and semi-automatic precision sniper rifles in calibers 5.56mm to 12.7mm and most notably has a NATO stock number for its premium Asymmetric Warrior® ASW-338 Lapua Magnum precision sniper rifle. This extensive amount of engineering and combat experience will undoubtedly give the company a decided advantage in India. The India Sniper Rifle, ISR-338LM is rightly named as "Baagh".

When asked about the importance of indigenous manufacturing under various Make-in-India programs and DAP 2020, Ashbury was very enthusiastic. The company described its forward leaning small arms transfer of technologies capabilities and collaborative JV manufacturing discussions with some of India's leading engineering, aerospace, defense and precision manufacturing companies. Ashbury's Directors noted for the record that India has world class manufacturing capabilities and ADGI fully intends to take full advantage of working with India's best companies!

Company representatives modestly pointed out that ADGI is the only company in India's narrowly defined sniper rifle manufacturing niche that provides proven "integrated sniper system solutions". ADGI provides Indian snipers with precision weapons engineering; a family of sniper rifles, support equipment & accessories, professional sniper training, and maintenance support.

It is important to ADGI's mission that the customers know that the company

**OVER THE PAST DECADE ASHBURY HAS BEEN AWARDED MORE THAN 26 PATENTS FOR PRECISION TACTICAL SNIPER WEAPON SYSTEMS AND RELATED COMBAT SUPPORT EQUIPMENT. ASHBURY IS PERHAPS BEST KNOWN IN WESTERN MILITARY CIRCLES FOR ITS PIONEERING WORK DEVELOPING INTEGRATED LASER RANGE FINDER LRF-GPS, PRECISION GROUND TARGET GEO-LOCATION SYSTEMS FOR FO, FAC, RECONNAISSANCE AND SNIPERS**

is built on the foundation of robust engineering, military professionalism and extensive small arms industry experience. Ashbury intimately understands the snipers' mission, equipment and training necessary for them to be successful. Ashbury Defense India brings a global sniper knowledge base and systems solutions to bear helping to ensure a high level of operational readiness and over-match capability on the battlefield!

*Raksha Anirveda* was

**India Sniper Rifle ISR-338 Lapua Magnum Block I Precision Sniper Rifle System**

# BUSINESS INITIATIVE

ASW-50 BMG Block I Precision Anti-Materiel Sniper Rifle w/Surefire SOCOM-50 SPS Suppressor

ISR-338LM Suppressed w/AN-PVS-26 & AN-PEQ-15 Laser

ASW-50 Suppressed w/CNVD-LR Night Vision Weapon Sight

ISR-338LM Infantry-Paratrooper-Special Forces Models

ISR-338LM w/LWTS-LR thermal weapon sight, multi-function laser range finder, AnyPoint Bipod-Tripod Mount, RSTA-II Snipers Tripod Shooting System

surprised to learn that while ADGI has a passionate depth of precision sniper rifle manufacturing expertise, knowledge and experience; its Executive Sniper Committee has well over 100 years of sniper centric doctrine, operational training, precision rifle marksmanship and combat sniping experience in worldwide theaters of combat operations. Quite interestingly one of ADGI's Director's is the former US Marine Corps, Officer-in-Charge of the esteemed Scout Sniper Instructor School located in Quantico, Virginia. Himself a qualified MOS-8541 Scout Sniper, he provides the company with guidance, leadership and vision.

**ADGI IS THE ONLY COMPANY IN INDIA'S NARROWLY DEFINED SNIPER RIFLE MANUFACTURING NICHE THAT PROVIDES PROVEN "INTEGRATED SNIPER SYSTEM SOLUTIONS". ADGI PROVIDES INDIAN SNIPERS WITH PRECISION WEAPONS ENGINEERING; A FAMILY OF SNIPER RIFLES, SUPPORT EQUIPMENT & ACCESSORIES, PROFESSIONAL SNIPER TRAINING, AND MAINTENANCE SUPPORT**

*Raksha Anirveda* also discussed ADGI's plans to offer the military and security forces small arms maintenance upgrades to extend the service life of select weapons. Ashbury has IP, expertise and experience refurbishing, modernizing and customizing small arms like India's aging fleet of Steyr SSG-69 sniper rifles, SVD Dragunov designated marksman rifles, Glock pistols and even newer Sako TRG-42 rifles. This really peaked my interest as I came to understand that ADGI staff's world class military trained gunsmiths, armorers and weapons engineers that have extensive levels of experience with commercial and military handguns, shoulder fired and crew served weapons. This will really help save money while improving the condition of in-service small arms.

Towards the conclusion of *Raksha Anirveda's* far-reaching discussions with Ashbury, their representatives mentioned that in addition to being partnered with Federal Premium (precision ammunition), Trijicon (combat optics), and OEM supplier of Surefire suppressors and L3 Integrated Vision Solutions (lasers/night vision & thermal weapon sights), ADGI is also Colt's Manufacturing LLC defence representative for India. Colt is perhaps the world's best known 5.56x45mm carbine and 7.62x51mm assault rifle manufacturing company in service with 90 nations around the world. There's little doubt Colt's new 5.56x45mm M5 Sub Compact Weapon (SCW) will take center stage with the Indian military soon. The Colt M5 is an advanced refinement of the highly respected M4 carbine.

Ashbury Defense Group (India) Pvt Ltd's Atmanirbhar Bharat spirit and intentions are indeed commendable and they join the ranks of many other like minded Indian MSME's seeking success in India's emerging new defence small arms manufacturing market.

*For more information on Ashbury Defense Group (India) Pvt Ltd. visit the company LinkedIn page www.linkedin.com/showcase/ashbury-defense-group-india-pvt-ltd*

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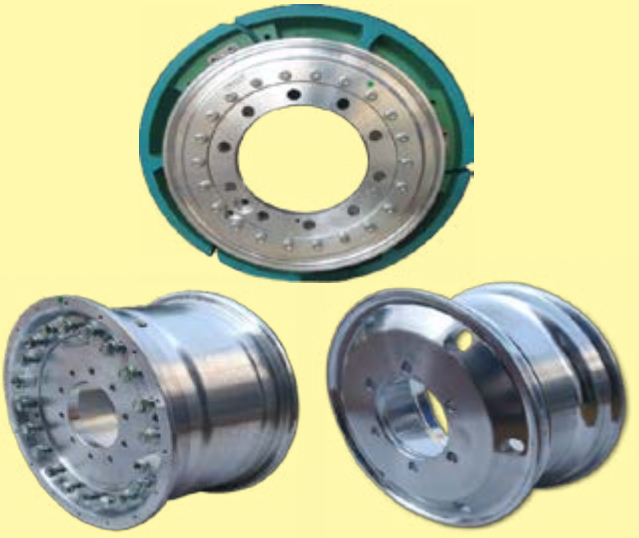

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EVENT REPORT

# DRONE MAHOTSAV 2022: INDIA ON WAY TO BECOMING A DRONE HUB

Liberalized rules for drones have opened up a new era of possibilities with the Indian private sector taking a long keen look at drones, its development, manufacture and even export. The forecast is easy that drones are the next big thing that will happen in India

By **SRI KRISHNA**

With increasing use of drones in various applications, especially in non-commercial applications for aerial cinematography, land surveys, agriculture and mining activities, disaster management, construction activities and mapping national highways and railway tracks, the recent two-day Drone 'Mahotsav' 2022 inaugurated by Prime Minister Narendra Modi saw more than 70 exhibitors putting up their products on display.

The drone industry got a massive boost as Prime Minister Narendra Modi inaugurating the Mahotsav said the government of India will provide full support to the industry to make this vision a reality and invited startups and manufacturers to make India a hub for drone technology.

"We have reduced unnecessary rules and roadblocks for the adoption of drones in the country. Drones can help in policing, traffic management, planting of new trees in remote areas and more... drones will change the way our country functions. Drones will aid in technology-driven delivery of services across India," he said.

The potential of drones has already caught the fancy of two of India's biggest corporate honchos—Mukesh Ambani and Gautam Adani—who showcased their wares at the show to draw the attention of the PM.

Ambani is leaving no stone unturned in his bid to diversify from a select few industries like oil, retail and telecom to software and showcased software for drone and aircraft design, pitting itself as an option as India liberalises its drone policies and doubles up on defence indigenisation.

Adani, too, has announced his foray by picking up a 50% stake in General Aeronautics, a drone maker.

A multi physics simulation firm, Sankhya Sutra, also showcased its products and solutions for drones at the drone festival.

Drone company stocks have delivered record returns of up to 160%. All the four listed entities—Paras Defence, Zen Technologies, RattanIndia Enterprises, and Bharat Electronics—have gained momentum.

According to a July 2021 report by BIS Research, the global drone market, which is currently dominated by the US, China and Israel, is estimated to reach US$ 28.47 billion in FY21-22, with India likely to account for a 4.25% share.

Realising the immense

potential of drones, which can substitute humans to perform difficult and time-consuming tasks, on August 26, 2021, the Indian government released 'Drone Rules, 2021', which comprised major upgrades of the existing drone norms.

The new drone laws have started facilitating traction in the market, as numerous companies are partnering to disseminate technology knowledge and attract funds.

COVID-19 has certainly proven to be a catalyst for large-scale adoption of drones by government agencies in India. The liberalised norms have heralded the flourishing of drone technology, surpassing the application of drones that were previously limited to government agencies alone. Companies involved in the drone industry in India are now breathing a sigh of relief since the government opened the economy to the drone market.

The 'Mahotsav' saw Reliance Industry's Asteria Aerospace Limited, a Bengaluru-based full-stack drone technology company showcase its rugged, reliable, and performance-driven drones for security and surveillance, surveying, and inspection applications across industry sectors.

**THE GLOBAL DRONE MARKET, WHICH IS CURRENTLY DOMINATED BY THE US, CHINA AND ISRAEL, IS ESTIMATED TO REACH US$ 28.47 BILLION IN FY21-22, WITH INDIA LIKELY TO ACCOUNT FOR A 4.25% SHARE**

Asteria also showcased its cloud-based drone operations platform, SkyDeck, for delivering scalable Drone-as-a-Service solutions.

PM Modi took out time to fly one of Asteria's drones.

Nihar Vartak, co-founder of Asteria Aerospace, said that this event is a great opportunity for the company to showcase its technology and solutions.

Reliance Group's Asteria Aerospace designs and develops drone-based solutions to transform enterprise operations using aerial data. It develops customised drone solutions using in-house hardware design, software development, and manufacturing capabilities.

The company's products and solutions are widely used by


# EVENT REPORT


THE MADE-IN-INDIA DRONES HAVE BEGUN TO GET EXPORT ORDERS FROM INTERNATIONAL CONSUMERS AND ARE IN HIGH-DEMAND

defence and homeland security agencies, civil government agencies, and private-sector companies in security, energy and utilities, agriculture, GIS, construction and mining. "We are working on mega projects. Currently, we are mapping a 50,000 sq km area in Andhra Pradesh and Telangana and will complete the work in 4-5 months," said Asteria's Vartak.

Said Ashok Wadhawan, who heads the Adani Defence and Aerospace Headland Systems: "We are promoting startups in the sector. We will soon start manufacturing a logistics drone capable of carrying a payload of up to 120kg, and then come up with drones for other payloads. The group is looking at agriculture drones and wants to be the market leader."

Adani-Elbit Advanced Systems India is one of the 14 beneficiaries under the government's product-linked

incentive (PLI) scheme for manufacturing drone and drone components. Adani-Elbit Advanced Systems India is a JV of Adani Group and an Israeli company.

"When we entered the defence UAV side in 2018, we brought the biggest Hermes 900 multi-role, medium altitude long endurance (MALE) drone (that is made by Israeli partner Elbit Systems). Now as we enter the civil side, we will grow taking both the organic and inorganic route," Wadhawan added.

Indian civilian drones are set to witness an enormous uptick of their order worth. The Made-in-India drones have begun to get export orders from international consumers and are in high-demand.

Arjun Aggarwal, MD of Aerodyne, said: "We're making in India for the sector now and orders have begun pouring in from Japan, Asia and the Gulf."

Garuda Aerospace, another giant participant in the drone sector has given orders for sending 12,000 drones. A significant number of those orders are from Malaysia, Panama and Africa. About 9,000 of them will probably be used for agricultural functions akin to spraying seeds.

The civil aviation ministry is anticipating a complete funding of Rs 5,000 crore within the next three years. The yearly gross sales turnover of the drone production business is anticipated to develop from Rs 60 crore in 2020-21 to over Rs 900 crore in 2023-24. The drone production business is anticipated to create more than 10, 000 direct jobs in the next three years.

*- The writer is a senior journalist and media consultant. The views expressed are of the writer and do not necessarily reflect the views of* ***Raksha Anirveda***


# Unravelling CIVIL AVIATION

## CIVIL AVIATION NEWS

# AMERICAN AIRLINES AND INDIGO LAUNCH CODESHARE AGREEMENT


**New Delhi:** American Airlines launched its codeshare agreement with India's leading airline, IndiGo, adding new options for customers traveling to India. American's customers are now able to book travel beyond Delhi on two of IndiGo's domestic routes, Bangalore (BLR) and Mumbai (BOM), providing a convenient option for customers arriving on American's New York (JFK)-Delhi (DEL) flight.

American and IndiGo plan to expand the codeshare in the near future to include more than a dozen additional destinations in India.

With the new codeshare agreement, members of American's AAdvantage® loyalty program now earn miles when traveling on American codeshare flights operated by IndiGo. Customers who aren't yet members of the award-winning AAdvantage program can enroll online and enjoy immediate benefits such as Group 6 boarding on flights operated by American.

IndiGo, India's largest airline by number of passengers carried, is based in Gurgaon, Haryana, India. With its fleet of more than 275 aircraft, the airline operates more than 1,600 daily flights, connecting 75 domestic destinations and 25 international destinations. Since the inception of the airline in 2006, IndiGo's 23,000 employees have professionally served more than 300 million customers.

Customers traveling in American's Flagship® Business cabin on DEL–JFK flights have access to IndiGo partner lounges in their originating city where they can relax, unwind and enjoy hot food, beverages, Wi-Fi and more.

# AIRBUS A321XLR TAKES OFF FOR THE FIRST TIME

**Hamburg.** Airbus' first A321XLR (Xtra Long Range) has successfully accomplished its first flight. The aircraft, MSN 11000, took off from Hamburg-Finkenwerder Airport for a test flight which lasted approximately four hours and 35 minutes. The aircraft's crew consisted of experimental test pilots Thierry Diez and Gabriel Diaz de Villegas Giron, as well as test engineers Frank Hohmeister, Philippe Pupin and Mehdi Zeddoun. During the flight, the crew tested the aircraft's flight controls, engines and main systems, including flight envelope protections, both at high and low speed.


The A321XLR is the next evolutionary step in the A320neo single-aisle Family of aircraft, meeting market requirements for increased range and payload, creating more value for airlines by enabling economically viable services on longer routes than any comparable aircraft model.

Entry into service is targeted for early 2024. The A321XLR will deliver an unprecedented single-aisle aircraft range of up to 4,700nm (8700 km), with 30% lower fuel consumption per seat compared to previous-generation aircraft, as well as reduced NOx emissions and noise. By the end of May 2022, the A320neo Family has accumulated over 8,000 orders from over 130 customers worldwide. A321XLR orders stood at more than 500 from over 20 customers.

# PRATT & WHITNEY CANADA SELECTS H55 AS BATTERY TECHNOLOGY COLLABORATOR FOR REGIONAL HYBRID-ELECTRIC FLIGHT DEMONSTRATOR PROGRAM

LONGUEUIL, Quebec: Pratt & Whitney Canada (P&WC), a business unit of Pratt & Whitney announced that H55 S.A. has been selected to supply battery systems for P&WC's regional hybrid-electric flight demonstrator program. The development of the battery component designs and associated electrical control systems will also be supported by the National Research Council Canada (NRC) and the Innovative Vehicle Institute (IVI).

The participation of H55 follows P&WC's July 2021 announcement of its plans to demonstrate hybrid-electric propulsion technology, through a $163 million investment, supported by the governments of Canada and Quebec. Working with Raytheon Technologies sister company Collins Aerospace, and De Havilland Aircraft of Canada Limited, P&WC is targeting a 30% improvement in fuel efficiency and commensurate reduction in CO2 emissions, compared to today's most advanced turboprop engines for regional aircraft. Collins Aerospace will provide the 1 megawatt electric motor for the hybrid-electric propulsion system.

As the technological spin-off of Solar Impulse, the first electric airplane to fly around the world, the mission of H55 is to make aviation clean, safe, and affordable. The Swiss-based company's core competencies lie in developing propulsion and energy storage solutions which are modular, lightweight, and safe. After having worked and flown four electric aircraft, H55 is well placed to act as a key enabler for electrified regional commuter transportation.

As Canada's largest federal research and development organization, the NRC has a century-long history and track record of contributing to the development of science and innovation in Canada. The NRC's contributions will include supporting the development of the high voltage battery sub-systems and their related elements. IVI will also support development work to optimize the design and integration of the battery and control systems on the De Havilland Canada Dash 8 experimental aircraft. Ground testing of the propulsion technology will begin in 2022, towards a flight demonstration in 2024.

Hybrid-electric propulsion technology is a core element of Pratt & Whitney's strategy for continually advancing the efficiency of aircraft propulsion systems, in support of the industry-wide goal of achieving net zero CO2 emissions for aviation by 2050. The company is also developing technologies to support greater use of cleaner, alternative fuels, including Sustainable Aviation Fuels (SAFs) and hydrogen, each of which will benefit from the increased efficiencies enabled by hybrid-electric propulsion systems.

# AKASA AIR TAKES DELIVERY OF THE FIRST OF ITS SEVENTY-TWO AIRCRAFT FROM BOEING

Mumbai. Akasa Air, India's newest airline took delivery of its much anticipated first Boeing 737 MAX aircraft in Seattle, USA. With a strong commitment to democratise the skies, the airlines' total order of 72 aircraft includes an initial delivery of 18 aircraft by March 2023, followed by delivery of the remaining 54 aircraft over the course of the next four years.

The 737 MAX family delivers superior efficiency, flexibility and reliability while reducing fuel use and carbon emissions. Providing the lowest seat-mile costs for a single-aisle airplane as well as high dispatch reliability and an enhanced passenger experience, the 737 MAX will be one of the key factors in ensuring that Akasa Air has a competitive edge in its home market.

# CIVIL AVIATION NEWS

## AIRBUS AND LINDE TO COOPERATE ON HYDROGEN INFRASTRUCTURE FOR AIRPORTS

Berlin. Airbus and Linde, a leading global industrial gases and engineering company, have signed a Memorandum of Understanding (MoU) to work on the development of hydrogen infrastructure at airports worldwide. The agreement follows a cooperation agreement signed in Singapore in February and covers collaboration on global supply chains for hydrogen, from production to airport storage, including the integration of refuelling into normal ground handling operations.


Both companies will define and launch pilot projects at several airports from early 2023 onwards. In addition, Airbus and Linde will analyse the potential of Power-to-Liquid fuels - a type of Sustainable Aviation Fuel (SAF) made from the synthetically produced liquid hydrocarbon through the conversion of renewable electricity.

The use of hydrogen to power future aircraft is not only expected to significantly reduce aircraft emissions in the air, but could also help decarbonise air transport activities on the ground. In 2020 Airbus launched the "Hydrogen Hub at Airports" programme to jumpstart research into infrastructure requirements and low-carbon airport operations, across the entire value chain. To date agreements have been signed with partners and airports in France, Italy, South Korea, Japan and Singapore.

The first ZEROe concept aircraft were unveiled in 2020, and development of the corresponding technology bricks is now underway in a global R&T network focused on developing the hydrogen technology for future commercial aircraft.

## THALES TECHNOLOGY SELECTED FOR THE NEW SCHENGEN 'ENTRY EXIT SYSTEM' IN SPAIN

**New Delhi.** By the end of this year, Schengen Member States will be required to have a biometric entry and exit system to register non-European citizens crossing an external EU border. Thales, in collaboration with the company Zelenza, has been selected by the Spanish Ministry of Interior to provide over 1,500 Manual Border Control Inspection units across all border-crossing points.

Those units located at the border officer's control point will be equipped with Thales EES Border Control Clearance Software and with Thales devices such as document readers with embedded document verification, fingerprint scanners, and face pods with a facial capture system. These integrated systems will deliver a fast and secure identity enrolment and clearance process for non-EU citizens at borders.

The contract will be executed over the next eight months during which these modern systems will be deployed at airports, ports and land crossings throughout Spain. Funded by the EU's Internal Security Fund, the new system will facilitate the border clearance of travellers while increasing the security at the Schengen Borders.

# THALES LAUNCHES HELIXVIEW, A REVOLUTIONARY AIRPORT SCANNER ALLOWING PASSENGER TO NOT REMOVE ITEM FROM LUGGAGE

**Paris/New Delhi.** Airport security checkpoints are synonymous with the stressful and complex process of having to juggle with bags, liquids, and electrical appliances. Passengers are rediscovering the pleasures of flight... along with some of the more laborious aspects of catching a plane such as that delicate phase at the security checkpoint where liquids and electronic items have to be removed from our hand luggage and scanned separately. In this context, Thales has developed a new scanner named HELIXVIEW, which could revolutionize the airport experience for both passengers and airlines companies.


HELIXVIEW, based on Thales expertise in Artificial Intelligence (AI) and Cybersecurity, is a stationary, compact, and lightweight EDS CB C3-compliant scanner (the next standard applied to the certification for EDS CB) that combines X-ray nanotechnology-based electronic scanning and 3D imaging reconstruction. With this solution installed in checkpoints, passengers will no longer need to remove their items from luggage. The technology is fine-tuned to detect all forms of prohibited items, whether explosives, knives, or even weapons that have been dismantled and positioned in separate parts across several bags.

Artificial Intelligence capabilities are leveraged to detect and interpret threats. The system then instantly provides the operator with a threat/no threat instruction for the bag.

Security airport concerns remain as present as ever for airport staff and airlines, who need to be able to ensure precise and failsafe threat detection. Checkpoints need higher degrees of security and, by association, higher levels of technological requirements and more powerful new-generation equipment. With a reduced size, weight and overall footprint, HELIXVIEW will enable airports to optimize the space at their disposal. Instead of heavy and cumbersome parts that require two people to lift them out of the machine for repair, the mechanics of this system are simple and motionless; there are no moving parts or vibrations. Anything that needs to be replaced can be done quickly, easily and no physically demanding.The HELIXVIEW product is aiming for certification by the end of 2023. This new solution beneficiates from the support of BPI through i-demo project initiative.

# AKASA AIR'S FIRST AIRCRAFT ARRIVES IN INDIA

**New Delhi.** Akasa Air, India's newest and most dependable airline, today, welcomed the arrival of the first of its 72 Boeing 737 MAX aircraft, at the Indira Gandhi International Airport, in the presence of its leadership team. The airline received the ceremonial keys for the aircraft at Seattle, USA on June 15th, 2022. The delivery of Akasa Air's first aircraft brings the airline closer to obtaining its Air Operator's Permit (AOP), which is required for it to launch commercial operations in the country. Akasa Air is a prime example of the progress made by Indian aviation in recent years and is also a testimony to the country's vibrant start-up ecosystem. This is not just a significant milestone for us and Indian aviation, but it's the story of a new India", added, Dube. Akasa Air's brand new aircraft arrives at a time when India's aviation market is finally witnessing a good recovery following a long slump because of the COVID-19 pandemic. As per credit ratings agency ICRA, the recovery in domestic passenger traffic has been strong post-Omicron and has reached 98% of pre-COVID levels in April and May 2022.

# CIVIL AVIATION NEWS


## PRATT & WHITNEY AND EMBRAER COMPLETE 100% SAF FLIGHT TESTING OF GTF-POWERED E195-E2 AIRCRAFT

**FORT LAUDERDALE, Fla.,** Pratt & Whitney and Embraer have successfully tested a GTF-powered E195-E2 aircraft on 100% sustainable aviation fuel (SAF). The test, with one engine running on 100% SAF, validated that GTF engines and the E-Jets E2 family can fly on both engines with blends of up to 100% SAF without any compromise to safety or performance. The aircraft completed two days of ground tests at Fort Lauderdale International Airport, culminating in a 70-minute flight test at Vero Beach Regional Airport in Florida. All Pratt & Whitney engines and Embraer aircraft are currently certified to operate with SAF blended up to 50% with standard Jet A/A1 kerosene, according to ASTM International specifications. Future specifications will enable blends of up to 100% SAF to maximize the emissions reduction potential of using fuel derived from sustainable, non-fossil-based feedstocks.

The SAF used by Embraer and Pratt & Whitney was 100% Hydroprocessed Esters and Fatty Acids Synthetic Paraffinic Kerosine (HEFA-SPK) acquired from World Energy. HEFA-SPK is a specific type of hydrotreated renewable feedstock fuel used in aviation and is considered a leading alternative replacement for conventional jet fuel by the Commercial Aviation Alternative Fuels Initiative (CAAFI), due to the sustainability of its feedstock. The Pratt & Whitney GTF™ engine is the only geared propulsion system delivering industry-leading sustainability benefits and world-class operating costs. It is the exclusive powerplant of the Embraer E-Jets E2 family, which reduces fuel consumption and CO2 emissions up to 25% per seat, NOx emissions by 50% and noise footprint by 75%.* Certified for operation on 50% sustainable aviation fuel (SAF) and successfully tested on 100% SAF, the engines are capable of even lower carbon emissions, which will help the industry meet its target of net zero emissions by 2050. The engine's revolutionary geared fan architecture is the foundation for more sustainable aviation technologies in the decades ahead.

## SAUDI ARABIA LAUNCHES AVILEASE - AIRCRAFT LESSOR TO SUPPORT AVIATION GROWTH

Riyadh: As a part of the kingdom's moves to diversify its economy away from oil, Saudi Arabia is launching an aircraft leasing company, AviLease. The Saudi Public Investment Fund (PIF) said in a statement that the new company's fleet will consist of new generation narrow-body and wide-body aircraft from the world's top manufacturers. It plans to start with purchase-and-lease-back transactions with airlines, portfolio acquisitions and direct orders from aircraft manufacturers. The Saudi PIF has approximately $620 billion of assets under management. According to the company statement, AviLease to be managed by a top-tier team, will offer leasing, trading, and asset management services and will also look to grow via acquisitions of other companies. "The launch of "AviLease" is a core element of Saudi Arabia's expanding aviation ecosystem, and is in line with PIF's strategy to enable the capabilities of promising sectors in Saudi Arabia," the company declared in the statement. PIF said the launch of AviLease will also help to support growth in the aviation sector, which is one part of the kingdom's Vision 2030 plan. According to a media report, the Saudi Arabia General Authority of Civil Aviation (GACA) plans to boost airports' capacity to handle 330 million passengers by 2030, including the construction of two major airports in Riyadh and Jeddah.

# EMBRAER AND TOYOTA COLLABORATE TO MAXIMIZE PRODUCTION EFFICIENCY

**SÃO JOSÉ DOS CAMPOS, Brazil:** Embraer has signed an agreement with Toyota do Brasil in order to embrace Toyota Production System (TPS) principles and concepts in its industrial operations. The initiative aims to eliminate waste, obtain operational efficiency, and increase value generation for stakeholders. During the first phase of this joint work, a team of TPS specialists from Toyota Brazil will immerse themselves in Embraer's daily work to evaluate and suggest improvements for the company's main manufacturing area at the Ozires Silva Unit, located in São José dos Campos, São Paulo.

"Bringing Toyota to execute this work reinforces Embraer's commitment to focus on business excellence and sustainable growth," said Francisco Gomes Neto, CEO of Embraer. "It will be an excellent opportunity to exchange knowledge and accelerate the usage of the Lean philosophy in the production systems, while strengthening practices already conducted by the Embraer Enterprise Excellence Program, the P3E." "TPS is a methodology that can contribute to different scenarios and occasions. More than efficiency and productivity, the TPS can provide solutions that allow industry and other sectors to continuously improve their processes, which is one of Toyota's pillars worldwide. There is still a possibility that we can contribute to the ESG agenda," said Rafael Chang, President of Toyota do Brasil.

Since 2007, Embraer has been following the Lean philosophy as a business strategy that spreads P3E principles, concepts, and practices. This program is responsible for leading transformations in an integrated way, paving the path for the entire company to make big steps in improving its processes. This system of excellence aims at safety first, quality always, and deliveries on time—all at the best cost. A reference in the concept of Industry 4.0, Embraer has made immense progress at the forefront of manufacturing technologies with digital, integrated, and low environmental impact factories, with continuous improvement of processes and adaptation of technology for people and operations. From 2022, the company's goal is to grow carbon neutral and, by 2024, have 100% of energy coming from renewable sources in Brazilian operations.

# FIRST HELICOPTER FLIGHT POWERED SOLELY BY SUSTAINABLE AVIATION FUEL

**Berlin.** An Airbus H225 has performed the first ever helicopter flight with 100% sustainable aviation fuel (SAF) powering both Safran's Makila 2 engines. This flight, which follows the flight of an H225 with one SAF-powered Makila 2 engine in November 2021, is part of the flight campaign aimed at understanding the impact of SAF use on the helicopter's systems. Tests are expected to continue on other types of helicopters with different fuel and engine architectures with a view to certify the use of 100% SAF by 2030.

The use of SAF is one of Airbus Helicopters' levers to achieve its ambition of reducing CO2 emissions from its helicopters by 50% by 2030. One of the main benefits of using this new fuel is that it allows the aircraft to minimise its carbon footprint while maintaining the same flight performance. According to the Waypoint 2050 report, the use of SAF in aviation could account for 50-75% of the CO2 reduction needed to reach net carbon emissions by 2050 in the air transport industry. While SAF production currently accounts for only 0.1% of total aviation fuel production, this figure is expected to increase dramatically in the coming years to meet both growing demand from operators and upcoming SAF usage mandates.

In June 2021, Airbus Helicopters launched the SAF User Group with the intention of bringing all stakeholders together to work on ways to accelerate the use of blended SAF kerosene and to pave the way toward 100% SAF flights for future fleets. All Airbus commercial aircraft and helicopters are certified to fly with up to a 50% blend of SAF. Our goal is to achieve certification of 100% SAF by 2030 for Airbus commercial aircraft and helicopters.

## CIVIL AVIATION NEWS

# AIRBUS A220 ASSEMBLY PROGRAM LAUNCHED BY SPIRIT AEROSYSTEMS IN MOROCCO

**Casablanca:** Launching the production of fuselage sections for the Airbus A220 at its North Africa site in Morocco, Spirit AeroSystems, one of the world's largest manufacturers of aerostructures, announced in a statement that Spirit's Morocco facility recently started producing the aft and forward fuselage sections as well as the keel-beams for the Airbus A220 aircraft, the manufacturer.

According to Spirit, the site has developed expertise in manufacturing a range of components for Bombardier business jets and now joins Spirit global sites already delivering on Airbus commercial programs. The structures are dispatched from Morocco for assembly at Spirit's Belfast facility in Northern Ireland.

Highlighting the Spirit's facility, which is located in Midparc, Casablanca's aerospace industrial park and economic Free Zone and began construction in September 2013, Morocco's Minister of Industry and Trade, Ryad Mezzour said, "Since then, the plant, at the cutting edge of technology specializing in the manufacture of aeronautical parts and structures, has established itself as one of the flagships of the aerospace industry in Morocco."

In 2017, Morocco's aerospace industry, pertaining to in-country activities involving the development, production, maintenance and support of aircraft and spacecraft, was valued at $1.1 Billion dollars according to an Airbus report titled 'The Great Enabler'. More than 300 employees will support Spirit's programs at the recently extended 250,000 square-foot manufacturing site.

"Spirit's new program, producing high-tech fuselage sections in Africa for the Airbus A220, following the recent extension of its site, further strengthens the Kingdom's positioning in complex, high value-added processes, as well as the international influence of our national aeronautics ecosystem," added Mezzour.

"The Kingdom (Morocco) already builds parts for all of Airbus' commercial aircraft, including the A220," said Mikail Houari, president for Airbus Africa and Middle East. "This aircraft is the latest addition to our product line and consequently to our industrial footprint in Morocco. With this achievement, A220 parts manufacturing is now well integrated in the Moroccan aerospace ecosystem and can proudly be described as 'Made in Morocco'."

Stephen Orr, vice president and general manager, Spirit AeroSystems, Morocco said: "We are developing an ambitious roadmap to accelerate the growth of our Casablanca site, with the support of our Ministry of Industry and Trade and are delighted to extend our manufacturing capability to include this latest programme for Airbus."


# PIPISTREL'S FULLY ELECTRIC VELIS ELECTRO RECEIVES UK CAA TYPE CERTIFICATION

**London:** Pipistrel, the Slovenian light aircraft manufacturer has received UK Civil Aviation Authority (UK CAA) type certification for its fully electric Velis Electro aircraft. The certification confirms that the design of the plane and its variants, including the Velis Electro, the Explorer, and the Velis Club, meets applicable airworthiness, noise and various other standards.

Announcing the news, Pipistrel in a statement on June 5, 2022 said that Velis Electro is now considered the world's only electric aircraft certified for performing flights.

"Achieving type certification by the UK CAA is a big milestone for Pipistrel in the UK, as well as within the wider aviation industry," Gabriel Massey, president and managing director, Pipistrel said in the statement. "The Velis Electro is now the only type-certified electric aircraft that can operate in the UK, and this opens up a world of possibility for sustainable flight."

Velis Electro already holds a full type certification issued by the European Union Aviation Safety Agency (EASA) in June 2020. The aircraft, which features a cantilever high-wing, a two-seat configuration inside the cabin, a fixed tricycle landing gear, and a single electric engine, is designed for pilot training purposes.

Made from composite materials, it is equipped with a 10.71 meter-long (35.1 ft) span wing, a liquid-cooled Pipistrel E-811 electric motor, and two 70 kilograms (150 lbs) weight 24.8 kWh liquid-cooled lithium batteries, which are connected in parallel for fault tolerance.

According to Pipistrel, the aircraft batteries are not swappable due to the liquid cooling and the weight of the battery unit. However, the manufacturer estimates that it takes two hours for the aircraft batteries to recharge from 30% to 100% capacity.

The new Pipistrel Velis Electro plane will be on display in an exhibition at the UK's Farnborough International Airshow 2022.

# AIRBUS INCREASES ITS UK INNOVATION FOOTPRINT TO DEVELOP NEW HYDROGEN TECHNOLOGIES

**Filton.** Airbus is strengthening its presence in the UK with the launch of a Zero Emission Development Centre (ZEDC) for hydrogen technologies. A priority for the UK ZEDC will be the development of a cost-competitive cryogenic fuel system required for the successful entry-into-service of Airbus' ZEROe passenger aircraft by 2035 and to accelerate UK skills and know-how on hydrogen-propulsion technologies. The UK ZEDC will benefit from the recent commitment by the UK Government to guarantee £685 million of funding to the Aerospace Technology Institute (ATI) over the next three years to support the development of zero-carbon and ultra-low-emission aircraft technologies. Technology development at the new UK ZEDC, to be based in Filton, Bristol, has already started and will cover the full product and industrial capabilities from components up to whole system and cryogenic testing. End-to-end fuel systems development, a speciality of Airbus in the UK, is one of the most complex technologies crucial to the performance of a future hydrogen aircraft. The ZEDC complements Airbus' existing Research and Technology footprint in the UK, as well as the work on cryogenic liquid hydrogen tanks being done at Airbus' existing ZEDCs in Madrid, Spain and Stade, Germany (composite structure technologies) and in Nantes, France and Bremen, Germany (metallic structural technologies). All Airbus ZEDCs are expected to be fully operational and ready for ground testing with the first fully functional cryogenic hydrogen tank during 2023, and with flight testing starting in 2026.

# APPOINTMENTS

## REAR ADMIRAL S VENKAT RAMAN ASSUMES CHARGE AS THE FOTNA

**New Delhi.** Rear Admiral S Venkat Raman, VSM assumed the charge as the Flag Officer Commanding Tamil Nadu and Puducherry Naval Area (FOTNA) from Rear Admiral Puneet Chadha, VSM in a ceremonial parade held at INS Adyar Parade Ground in Chennai on May 20. Rear Adm Chadha, who took over as the FOTNA on June 30, 2020, will be proceeding to New Delhi to assume the charge as the Additional Director General of National Cadet Corps.

Rear Admiral S Venkat Raman, VSM was commissioned into the Indian Navy on January 1, 1990. He is an alumni of the National Defence Academy, Khadakwasala, Defence Services Staff College, Wellington and the College of Defence Management, Hyderabad. The Flag Officer is a specialist in Communications and Electronic Warfare, and has tenanted various appointments on frontline warships of the Indian Navy. His sea tenures include command of the stealth frigate INS Tabar and second in command of the Aircraft Carrier INS Viraat.

His significant staff appointments include a tenure as the Fleet Communications Officer Western Fleet and as the head of the Directorate of Naval Intelligence at the Naval Headquarters. Prior to taking over as the Flag Officer Commanding Tamil Nadu and Puducherry Naval Area, he has held the appointment of the Commandant, Naval War College, Goa. He was awarded the Vishist Seva Medal in 2019.

## AIR MARSHAL A P SINGH TAKES CHARGE AS AOC-IN-C CENTRAL AIR COMMAND

**New Delhi.** Air Marshal A.P. Singh took charge as Air Officer Commanding-in-Chief (AOC-in-C) Central Air Command (CAC) on July 1. He was commissioned into the fighter stream of IAF on December 21, 1984. He is an alumnus of National Defence Academy, Defence Services Staff College and National Defence College. A Qualified Flying Instructor and an Experimental Test Pilot, he has more than 4900 hours of flying experience.

His operational tenures include being the Flight Commander and Commanding Officer of a MiG-27 Squadron and Air Officer Commanding of an air base. As a test pilot, he has served in 'Aircraft and System Testing Establishment' in various ranks and capacities. He led the MiG-29 Upgrade Project Management Team at Moscow, Russia. He was the LCA Project Director (Flight Test) at 'National Flight Test Centre' and Air Defence Commander at South Western Air Command. Prior to assuming the present appointment, he was Senior Air Staff Officer at Eastern Air Command.

For his distinguished service, the Air Marshal was awarded with Ati Vishisht Seva Medal by the President of India on January 26, 2019. On assuming appointment, the AOC-in-C was presented a ceremonial Guard of Honour. He then laid a wreath at the CAC War Memorial, paying tribute to the brave Air Warriors who laid down their lives serving the nation.

# CMDE PR HARI TAKES OVER AS CHAIRMAN & MANAGING DIRECTOR OF GRSE

**Kolkata:** Commodore P R Hari, IN (Retd), took over as Chairman & Managing Director, Garden Reach Shipbuilders & Engineers (GRSE) Ltd on June 10. He has a vast experience of over 32 years in warship operations, maintenance, design and shipbuilding. He has been in charg+e of Production Planning of all the new construction ships built at the Shipyard since 2016 and assumed charge as Director (Personnel) of the Company on October 21, 2019 and headed the Human Resources, Corporate Planning and Technical functions of GRSE including ERP and Yard Modernisation.

Cmde Hari served for over 28 years in the Indian Navy where he has served in Senior appointments onboard Warships and at Naval Repair Organisations. He also held important Staff Appointments and also steered the Indigenous Aircraft Carrier project as Warship Production Superintendent, Kochi. He holds a Bachelor's Degree in Mechanical Engineering and a Master's in Defence & Strategic Studies. An alumnus of the Defence Services Staff College, Wellington, the officer also underwent the 5th Higher Defence Orientation Course at the Army War College, Mhow and the prestigious Naval Higher Command Course at Naval War College, Goa. Cmde Hari is a keen sportsman, a voracious reader, and an extempore speaker who occasionally pens his thoughts. Cmde Hari has a vision to take GRSE to the next level of existence by inducting latest technology such as Artificial Intelligence in operations and adopting transformational changes in human resource management.

# RICK DEURLOO SUCCEEDS CARROLL LANE AS PRESIDENT OF PRATT & WHITNEY COMMERCIAL ENGINES

**EAST HARTFORD, Conn.:** Pratt & Whitney today named Rick Deurloo president of its Commercial Engines business. In this position, Rick will retain his current responsibilities as senior vice president and Chief Commercial Officer (CCO) for Pratt & Whitney while assuming overall leadership of the Commercial Engines business from Carroll Lane, who has elected to leave the company for another leadership opportunity. Deurloo will assume this expanded role effective immediately and will continue to report to Pratt & Whitney President Shane Eddy.

Deurloo joined the former United Technologies Corporation in 1998 and has more than 20 years of experience in management and sales in the global aerospace industry. Prior to his role as senior vice president and CCO, where he was responsible for leading and directing all Sales, Marketing and Customer Support worldwide for Pratt & Whitney Commercial Engines and International Aero Engines (IAE), Deurloo held other senior leadership positions including regional vice president of sales for the Americas. Lane has held leadership roles with the former United Technologies Corporation and Pratt & Whitney for more than nine years, including president of the Commercial Engines business for the past two and a half years, where he led the organization through the pandemic as well as the realignment of the Commercial Engines business.

# HAL GETS NEW CHIEF EXECUTIVE OFFICER M K MISHRA

**Bengaluru.** Mihir Kanti Mishra took over as Chief Executive Officer of India's leading defence PSU Hindustan Aeronautics Limited (HAL) Bangalore Complex. Prior to this, he was heading Aerospace Division as General Manager. Mishra joined HAL as Management Trainee in 1987 and is a graduate in Mechanical Engineering from Sambalpur University, Odisha. He also holds Master's degree in Aircraft Production Engineering from IIT, Chennai and has undergone Management Programme at IIM, Bangalore.

Mishra started his career in manufacturing and assembly of MiG engines under Transfer of Technology (TOT) programme at Engine Division, Koraput and worked on absorption and assimilation of technical know-how and prove-out of manufacturing process for series production of MiG engines.

His 35-plus years of experience in HAL includes a wide array of business verticals

– engine, aircraft and space. He also held important positions in manufacturing, assembly, engineering, strategy planning, project management and international marketing. He led the team to support ISRO, as strategic partner for the prestigious space programs. He was instrumental in driving the business growth by moving upwards in value chain through establishment of new facilities for cryo engine manufacturing and for providing end-to-end realisation of launching vehicle along with integration activities.

# NEWS ROUND UP

## ERDA TO ORGANISE EMI/EMC EVALUATION TECHNIQUES WORKSHOP ON JULY 21


**Vadodara/New Delhi:** ERDA is organising One Day Workshop on "EMI/EMC Evaluation Techniques for Electrical and Electronics Equipment & Machinery" on July 21, 2022 from 10:00 AM to 05:00 PM at ERDA, Vadodara.

One of the major challenges for manufacturers in today's world is to minimize the electromagnetic interference effect which is generally generated due to increasing usage of high speed and high-frequency switching in the device. Testing evaluation of the designed product is necessary as per the required standard so that the performance of the designed product can be ensured. This workshop is designed to discuss the requirements of various standards for commercial products and MIL products & also the common failures observed against these requirements.

Following standards will be covered in the workshop:

1. Commercial product (Energy Meter/Relay/ Lighting Product) testing as per IEC 61000-4, IEC 61000-6-2 & IEC 61000-6-4, IEC 60255-26
2. MIL Product testing (Control panel) as per MIL461 E/F

**KEY FOCUS**

- Electromagnetic waves and their propagation
- Scope and Requirements of the standards
- Common Failure of the products
- Testing Facility available at ERDA
- Lab Visit

Register by visiting on this link: https://forms.gle/dKWufMYDnTgvDcuW8 or you may visit ERDA's website www.erda.org. In case of any queries feel free to contact Pranav Parikh @ +91 82380 53682 or write to us at bd@erda.org

## A STEP TOWARDS GREEN SHIPPING: MAZAGON DOCK LAUNCHES FCEV PROTOTYPE

**Mumbai.** Mazagon Dock Shipbuilders Limited (MDL) in a step towards achieving green shipping, successfully launched Fuel Cell Electric Vessel (FCEV) prototype. Conceptualized and developed by MDL with technology partners – Tata Advanced Systems Ltd & Vijai Marine Services Pvt Ltd, it is the very first hydrogen boat prototype. The FCEV will use a green hydrogen cell system and the vessel is a 6 passenger boat.

According to an official statement of MDL the boat is fitted with a 6 KW Electric OBM, a 10.2 KWH Battery Fuel Cell System and has the capability to run for almost 22 hours with compressed Hydrogen filled in PESO approved Cylinders. Hydrogen fuel cell systems have zero toxic emission, few moving parts with low heat and acoustic signature. The shipyard MDL is well known for building Scorpene class submarines in joint collaboration with French company NAVAL Group and delivering it to the Indian Navy. Now, the shipyard has developed the Fuel Cell based Electric Vessels, setting an example of how innovation can save the planet and adopting sustainable cost-effective alternate fuel.

At the launch event, Chairman and Managing Director VAdm Narayan Prasad (IN Retd.), MDL, Cdr Jasbir Singh (Retd.), Director (Submarine and Heavy Engineering), Sanjeev Singhal, Director (Finance), Biju George, Director (Shipbuilding) and Cdr Vasudev Puranik (Retd.), Director (Corporate Planning and Personnel) were present along with the senior executives from Tata Advanced Systems Ltd. and MDL.

Earlier this year, keeping in pace with Global Maritime Transitions, Cochin Shipyard Ltd (CSL) was identified by the Ministry of Ports, Shipping and Waterways to develop the country's indigenous Hydrogen Fuelled Electric Vessels. It has partnered with KPIT Technologies Limited and Indian Register of Shipping for developing rules and regulation for such vessels. The vessel being built at CSL is expected to come around Rs 17.50 crores and according to the information available in the public domain, 75 percent of this cost will be funded by the centre. Hydrogen Fuel Cell Vessel, also termed as Fuel Cell Electric Vessel (FCEV) is based on Low Temperature Proton Exchange Membrane Technology (LT-PEM). The technology is environment friendly, with zero emission, and direct current (DC) power source is now being developed for marine application. This technology has higher efficiency when compared to combustion engines and allows energy to be concentrated more densely than in petroleum fuels. It has several applications and can be used not only in transportation but in material handling, emergency backup power applications, and stationary, portable, and emergency backup power applications.

# NEWSPACE SIGNS MOU WITH L&T TO DEVELOP UNMANNED AERIAL SYSTEMS, SWARM ROBOTS

## Unveils Underwater-launched UAV at Drone Mahotsav

**New Delhi:** NewSpace Research & Technologies Pvt. Ltd. ("NRT") and Larsen & Toubro Limited ("L&T") signed a Memorandum of Understanding (MoU), to jointly develop technologies and manufacture cutting edge products in the field of Unmanned Aerial Systems, Swarm Robotics and related Payloads in line with the "Atmanirbhar Bharat" initiative of the Prime Minister.

The MoU was executed by Arun Ramchandani, EVP & Head, D&A SBG, L&T Defence and Sameer Joshi, CEO, NRT and was exchanged on May 27, 2022, during the "Drone Mahotsav", a mega event of the Drone Federation of India (DFI) organised under the aegis of the Ministry of Civil Aviation at Pragati Maidan, New Delhi. The event was inaugurated by the Prime Minister of India.

NRT had raised $21 million recently and won contracts from the defence ministry (Indian Army) worth $15 million for 100 swarm drones.

With a track record of more than 10 NextGen projects delivered, NRT's team is building smart next-generation aerospace technologies which include unmanned air systems, collective robotics, GPS denied operations, augmented reality, virtual reality and machine learning and artificial intelligence. NRT won the 'Swarm Architecture' award last year in the Mehar Baba Swarm Drone Competition, conceptualised by Indian Air Force. At the Drone Mahotsav, NRT and L&T unveiled an underwater launched UAS program, as part of their maiden R&D effort under this MoU to launch UAVs from submarines.

As a part of this MoU, NRT will bring in its flexible UAV development approach while L&T will contribute its track record and capabilities in engineering and solutions in the underwater platform domain. The companies will aim to explore and address opportunities across the world in Unmanned Mobility in the defence as well as civilian domains. Unmanned Aerial Systems, better known as UAVs or drones have the potential to greatly force multiply at the tactical level, providing situational awareness, surveillance capabilities and vital intelligence inputs to the armed forces.

# DSIT UNVEILS KNIGHTSHIELD MOBILE TASK FORCE UNDERWATER SECURITY SYSTEM

**Tel Aviv:** Israeli company DSIT - a subsidiary of Rafael, has unveiled its KnightShield mobile task force underwater security system. The system supports task force underwater protection, simultaneously protecting multiple ships anchored at ports, port entrances, and designated areas of port basins from swimmers, UAVs, SDVs and sabotage attempts. Based on the sophisticated technology implemented in PointShield, DSIT's advanced Diver Detection Sonar (DDS) Systems, KnightShield covers medium ranges in ports, delivering exceptional reliability and precision. Providing fully automatic detection, tracking, classification, and alerts regarding underwater intrusion, smugglers, and sabotage attempts, the system detects hostile divers – whether using closed or open breathing apparatus – as well as AUVs, SDVs, DPVs, and UUVs. Housed in a 20 ft. ISO container, KnightShield is easily transported, as needed, between platforms and dock locations such as ports, harbours, and terminals. Designed for use during deployment of expeditionary forces and escalated threat levels, the solution can be easily stored when not required. Recently DSIT, signed an MOU with the Al Fattan Group from the UAE for the supply of its advanced underwater sonar systems. These systems, which Al Fattan will provide to local customers, will be used for the protection of sensitive facilities and strategic assets in the UAE.

# NEWS ROUND UP

## SCHIEBEL CAMCOPTER® S-100 PERFORMS MARITIME SURVEILLANCE FOR ROYAL DANISH NAVY

**Vienna.** The Royal Danish Navy (RDN) is operating the Schiebel CAMCOPTER® S-100 for maritime surveillance. The Remotely Piloted Aircraft System (RPAS) service is delivered by the European Maritime Safety Agency (EMSA).

Stationed in Denmark's northernmost town Skagen, the CAMCOPTER® S-100 is supporting the RDN alongside other national authorities in carrying out various maritime surveillance tasks, including detecting, verifying and providing information on potential oil spills and discharges at sea.

All data gathered from the flights is shared live through the EMSA RPAS Data Centre allowing users to monitor any unusual activity at sea with a potentially harmful impact on the safety and security of persons and vessels in the area or affecting the environment itself. The S-100's multiple state-of-the-art sensors significantly enhance the maritime surveillance capabilities of the RDN.

The UAS is equipped with an L3 Wescam Electro-Optical / Infra-Red (EO/IR) camera gimbal, an Overwatch Imaging PT-8 Oceanwatch and an Automatic Identification System (AIS) receiver.

# INDIAN ARMY SENDS OUT RFI FOR 800 INDIGENOUS LAMVS

**New Delhi:** The Indian Army looking to buy around 800 light armoured multipurpose vehicles (LAMVs) sent a Request for Information (RfI) on July 1 to several vendors. The LAMVs will be deployed in high altitude areas, deserts and plains with the mechanised and armoured units of the Indian Army.

The LAMVs proved their worthiness in the recent conflicts including the ongoing Russia-Ukraine war as the "to-go" vehicles which are needed in a war zones where the troops need to be moved around and be protected from threats posed by small arms fire, hidden explosive devices and shell splinters.

The RfI has been issued to identify the vendors in India who can deliver the 800 vehicles from the time the contract is signed. These vehicles will be in line with the government's "Atmanirbhar Bharat" initiative and will be used for surveillance as well as reconnaissance operations once they are deployed in different terrains across the country.

According to the RfI, these LAMV should have adequate mobility and capability to protect the troops inside. Besides carrying troops, these vehicles will also be used for carrying loads of ammunition, surveillance and communication systems to be used for mandated operational tasks. Since the vehicles will be deployed in different terrains –desert, plains and high altitude, they have to have the capability to issue early warning and intelligence and also be adaptable with drones. It may be noted that for the first time, an Indian company TATA Motors had put on display LAMV at the DefExpo in New Delhi in 2014. This LAMV showcased its capability to be used for reconnaissance mobility, protection and firepower. The vehicle displayed at the TATA stand had a modular design which could be upgraded and also retains its functional superiority throughout its service life. With technological edge, the vehicle is good for tactical battlefields and can be deployed in different terrains in the country. It also has low life cycle cost as it is mostly indigenised and the subsystems shared commonality with the other standard vehicles.

The TATA vehicle also has composite and ceramic armouring, has a separate crew compartment and a blast deflecting "V" shaped hull. There are bulletproof windscreens too and can take a six person crew.

# SURFACE-TO-AIR MISSILE SUCCESSFULLY TESTED BY INDIAN NAVY

**New Delhi:** The Indian Navy on May 26 shared a video of it successfully testing surface-to-air (SAM) missile system from warship by taking down a low flying target.

The video posted by the Indian Navy on Twitter shows the SAM system moving towards the target at a lightning speed after being launched from a guided-missile anti-submarine stealth frigate. The missile is seen hitting the object right above the surface. The 36-second clip starts with the missile coming out of its silo on the warship. It is then moving to take the right position to hit the target. After it is launched, the missile moves towards its target and a blast is heard, as well as seen, just above the waters.

Sharing the video, the Indian Navy wrote, "All in a day's work! Watch Your Navy's guided-missile anti-submarine stealth frigate do what it does best - successfully engage a low flying target with its SAM system, reaffirming the mantra of her crew, HIT FIRST! HIT HARD! Congrats to the team for a text book bulls eye!"

On May 18, 2022, the Indian Navy successfully carried out the maiden test firing of the first indigenously developed naval anti-ship missile from a SeaKing 42B helicopter in Odisha's Balasore. Earlier this year, an anti-ship version of the BrahMos supersonic cruise missile was successfully test-fired by the Indian Navy and the Andaman and Nicobar Command.

# INDIGENISATION OF DEFENCE EQUIPMENT SPEEDED UP BY DEFENCE MINISTRY

**New Delhi:** In a move to reduce dependence on import of equipment, the defence ministry said it has intensified the drive for indigenisation of defence items being carried out by state-run manufacturers. It said the progress of the indigenisation process by the defence public sector undertakings (DPSUs) is being reviewed on weekly basis by Defence Secretary Ajay Kumar.

The ministry said a comprehensive user-friendly 'dashboard' on the SRIJAN portal has been developed to monitor the status of progress of the indigenisation process. "This dashboard enables real-time end-to-end updates of various activities being taken up by the respective DPSUs during the process of indigenisation," the ministry said in a statement.

"It provides transparent information, analytics and various customised reports to assess the performance of the DPSUs," it said. The ministry said relevant information like details of items to be indigenised, tentative order quantity, concerned DPSU, route of indigenisation to be adopted, details of in-charge nodal officer, requests for proposal and project sanction order have been kept in public domain to make it accessible to the industry.

"The dashboard will be accessible by industry shortly. The industry partners can view the details on the dashboard and avail opportunity as per their capabilities in order to become partners in 'Aatmanirbhar Bharat'," the ministry said.

In a major push towards defence indigenisation, Defence Minister Rajnath Singh last month unveil the third list of over 100 military systems and weapons that will be put under import restrictions under a staggered timeline of over three-and-half years.

The defence ministry said orders worth more than Rs 2, 10,000 crore are likely to be placed on the Indian

industry in the next five years as part of the items covered in the third list. The first "positive indigenisation" list of 101 items that included towed artillery guns, short-range surface-to-air missiles, cruise missiles and offshore patrol vessels was issued in August 2020. In May last year, the government approved restrictions on the import of an additional 108 military weapons and systems such as next-generation corvettes, airborne early warning systems, tank engines and radars under a staggered timeline of four-and-half years. In the last few years, the government has taken a series of measures to promote domestic defence production.

India is one of the largest importers of arms globally. According to estimates, the Indian armed forces are projected to spend around US$ 130 billion (one billion is equal to 100 crores) in capital procurement in the next five years. The government now wants to reduce dependence on imported military platforms and has decided to support domestic defence manufacturing.

The Defence Ministry has set a goal of a turnover of US$ 25 billion (Rs 1.75 lakh crore) in defence manufacturing in the next five years that including an export target of US$ 5 billion (Rs 35,000 crore) worth of military hardware.

# NEWS ROUND UP

## INDIAN ARMY GETS ITS FIRST WOMAN COMBAT AVIATOR IN CAPTAIN

**New Delhi:** After completing a year-long course at the Combat Army Aviation Training School at Nashik, Captain Abhilasha Barak on May 25 became the first woman to join the Army Aviation Corps as a helicopter pilot. "Captain Barak became the first woman officer to join the Army Aviation Corps as combat aviator after successful completion of the combat Army aviation course," an official said. Barak was commissioned in the Army Air Defence Corps in September 2018. She was awarded 'wings' along with 36 army pilots by Army Aviation director general Lieutenant General Ajay Kumar Suri during a valedictory ceremony at the Nashik-based training school. She hails from Haryana and is the daughter of a retired colonel.

Barak has been assigned to the second flight of 2072 Army Aviation Squadron that operates the Dhruv advanced light helicopter (ALH), according to the officials familiar with the matter. The army took a decision in early 2021 to allow them to opt for its aviation wing. Until now, women officers were assigned only ground duties in army aviation. Barak became the army's first woman combat aviator at a time when the National Defence Academy is set to induct its first batch of women cadets in June 2022. The Supreme Court opened

## DEFENCE MINISTRY INKS CONTRACT WORTH OVER RS

**New Delhi:** Defence Ministry on May 31 inked a contract with Bharat Dynamics Limited (BDL) for supply of ASTRA MK-I Beyond Visual Range (BVR) Air to Air Missile (AAM) and associated equipment for the Indian Air Force and Indian Navy at a cost of Rs 2,971 crore.

The technology to manufacture missile of this class indigenously was not available till now. According to the Ministry, ASTRA MK-I BVR AAM has been indigenously designed and developed by Defence Research and Development Organisation (DRDO) based on the requirements by the Indian Air Force (IAF) catering for Beyond Visual Range as well as Close Combat Engagement reducing the dependency on foreign sources.

Air to Air missile with BVR capability provides large Stand Off Ranges to own fighter aircraft which can neutralise the adversary's aircraft without exposing itself to the adversary's Air Defence measures, thereby gaining and sustaining superiority of the Air Space, the Ministry said.

This missile is technologically and economically superior to many such imported missile systems. ASTRA MK-I missile and all associated systems for its launch, ground handling and testing

# ABHILASHA BARAK

the doors of the academy to women in a landmark order in October 2021. They are now eligible for permanent commission as well.

The Army Aviation Corps, raised in November 1986, operates the ALH, Rudra helicopters (armed variant of ALH), Chetaks, Cheetahs and Cheetal helicopters. It also carries out an important role in supporting the army's deployments in high altitude areas, including the Siachen Glacier.

The women officers in the Indian Air Force and the Indian Navy have been flying helicopters for long. In 2015, came one of the turning points for women in the military when IAF decided to induct them into its fighter stream. Last year, the Indian Navy deployed four women officers on warships after a hiatus of almost 25 years.

# 2,900 CRORE

has been developed by DRDO in coordination with the IAF. The missile is fully integrated on the Sukhoi Su-30MK-I fighter aircraft and will be integrated with other fighter aircraft in a phased manner, including the Light Combat Aircraft (TEJAS).

The IAF has successfully undertaken trials for the missile. The Indian Navy will integrate the missile on the MiG-29K fighter aircraft.

The Transfer of Technology from DRDO to BDL for production of ASTRA MK-I missile and all associated systems has been completed and production at BDL is in progress, the Ministry said. This project will create opportunities for several MSMEs in aerospace technology for a period of at least 25 years. The project will help facilitate realising the country's journey towards self-reliance in Air to Air Missiles.

# CYBER AND SPACE DOMAINS ARE 'NEW BATTLEFIELDS' SAYS AIR CHIEF

**New Delhi.** With Sino-Indian border tensions continuing to simmer and the Russia – Ukraine conflict continuing, Indian Air Force Chief, Air Chief Marshal V.R. Chaudhuri cautioned that "coercion is the new strategy, with cyber, information and space domains becoming the new battlefield". Alluding to the new forms of engagement between states, he said, "Diplomacy, economy, and information are becoming the primary tools of engagement with the military instrument being used as a deterrent".

Addressing the capstone seminar of IAF's first Warfare and Aerospace Strategy Programme (WASP) here, Air Chief Marshal (ACM) Chaudhari also spoke about the changing nature of the international system, indicating the emergence of a "complex multipolarity".

He contended that within this multipolar structure, a world has developed with "little or no regard to rules or the traditional processes of geopolitical interplays. Therefore, we must reassess our strategic priorities and realign our actions to ensure we don't get left behind".

Explaining the rationale behind the WASP, the Air Chief said, "It was started with an aim to generate strategic thought and understanding amongst our officers. The ultimate aim of this course is to inculcate a culture which promotes reading, a keen sense of analysis, and ability to produce well-drafted documents".

The WASP was organised by the College of Air Warfare in Telangana, which is the IAF's premier institute for Air Power studies. Essentially, the course aims to restructure critical thinking among IAF officers, enhance their intellectual capital, and teach them "how to think" rather than "what to think", he said.

The course included classes on military and air power theory, strategy, national power and International Relations. The essence of the program was in "contextualising these concepts to suit our interests in the 21st-century paradigm", the Air Chief said.

On the long-term goals of the course, he said that they centre around "nurturing our medium-level officers to gain knowledge and contribute to building sound operational plans for the IAF". While developing a more nuanced understanding of the sciences, theories, and philosophies behind war is critical, Air Chief Marshal Chaudhari cautioned that "a military strategist must not lose sight of the primary objective, and that is War Fighting".

"Thus, the essence is to focus on operational level critical thinking and strategy," the IAF chief said. To leverage the gains from the WASP course and incorporate the learnings into the structure and functioning of the IAF, he explained that they were looking at "employing WASP qualified officers on important deputations in the ministry, into operational Commands, think tanks, critical tri-service positions, directing staff at training establishments and as IAF spokespersons", amongst other positions.

"You must remember that while a well-crafted strategy may not guarantee success, the absence of a coherent and sustainable strategy will surely lead to failure," he said.

NEWS ROUND UP

# SECOND LARGE SURVEY VESSEL 'NIR

**Kolkata / Chennai:** The second of the four Survey Vessels (Large) (SVL) Project - Yard No 3026 – 'Nirdeshak' being built by GRSE in collaboration with L&T shipbuilding for Indian Navy was launched on May 26. The Survey Vessel was launched by Sarbani Dasgupta, wife of Vice Admiral Biswajit Dasgupta, AVSM, YSM, VSM, Flag Officer Commanding-in-Chief, Eastern Naval Command.

Vice Admiral Biswajit Dasgupta was the Chief Guest at the occasion. Among the others present at the ceremony were Vice Admiral Kiran Deshmukh, AVSM, VSM, Controller of Warship Production & Acquisition, Vice Admiral Adhir Arora, NM, Chief Hydrographer, Cmde P R Hari IN (Retd), Chairman and Managing Director (Officiating) GRSE, Shri R K Dash, Director (Finance), GRSE, other Senior Officials of GRSE, L&T and Indian Armed Forces.

This is the second vessel in a series of four such ships being built by GRSE for the Indian Navy to be launched in less than six months. The first ship, INS Sandhayak, was launched in Kolkata on December 5, 2021. The contract for building four SVL ships was signed between MoD and Garden Reach Shipbuilders & Engineers (GRSE), Kolkata on October 30, 2018.

The ship has taken its name from erstwhile Nirdeshak which was also an Indian Naval Survey ship and was decommissioned after 32 years of glorious service in December 2014. Part construction of three out of four ships of SVL is being undertaken at L&T, Kattupalli as part of collaborative approach between GRSE and L&T shipbuilding. This model of Public Private Partnership shall be harbinger of future successful

# 'BHARAT 150'- MULTI-PAYLOAD DRONE BY KALYANI GROUP UNVEILED AT THE 'BHARAT DRONE MAHOTSAV 2022'

**Pune.** Kalyani Strategic Systems Limited (KSSL), the defence arm of Kalyani Group, Pune based Indian conglomerate unveiled the unique drone BHARAT 150, a multi-payload, variable mission drone indigenously developed by the group. The X-8 configuration drone is already under testing by the Indian Army in high altitude areas in Leh-Ladakh and performed 8.5 KM with 20 kg payload.

The drone is a vertical take-off and landing (VTOL) Unmanned Aerial Vehicle (UAS), with a maximum take-off weight of 150 kg and empty take-off weight of 58 kg. The craft comes integrated with an indigenously developed radio communication system and Inertial Navigation System (INS) with anti-jamming and anti-spoofing capabilities, making it operational in jamming and GPS-denied environment as well.

The drone's batteries can give minimum 30 minutes of endurance with a communication link encryption (128 AES) for 50 km – 200 KM. The endurance can be enhanced as per the application.

The water and dust proof Bharat 150 can be used in the temperature range of -30°C to 65°C with an average speed of 50 Km/h and a

# DESHAK' LAUNCHED BY GRSE

collaboration for Warship construction in India. The SVL ships will replace the existing Sandhayak Class survey ships with new generation hydrographic equipment to collect oceanographic data. The Survey Vessel (Large) ships have a deep displacement of about 3400 tons and a complement of 235 personnel. The ship is designed to operate at cruise speed of 14 knots and maximum speed of 18 knots. Bow & Stern Thrusters have been catered for better manoeuvring at low speeds required during shallow water survey operations. The hull of these ships is made from indigenously developed DMR 249-A steel manufactured by Steel Authority of India Limited.

These modern, indigenously developed 110-metres long and 16-metres wide ships have a displacement of nearly 3,400 tonnes and can attain a top speed of 18 knots with an endurance of 6,500 nautical miles. With a capability to carry four Survey Motor Boats and an integral helicopter, the primary role of the ships would be to undertake full scale coastal and deep-water hydrographic surveys of Ports and navigational channels. The ships would also be deployed for collecting oceanographic and geophysical data for defence as well as civil applications. In their secondary role, the ships are capable of providing limited defence, besides serving as Hospital ships during emergencies.

Despite challenges due to COVID-19 pandemic, GRSE has made substantial progress and aim to deliver Sandhayak, the first ship of SVL by January 2023. The delivery of the second ship Nirdeshak is likely by April 2023. Launch of the second Survey Vessel reinforces our resolve for indigenous shipbuilding as part of the vision of 'Make in India', and 'AatmaNirbhar Bharat'. The Survey Vessels Large will have over 80% indigenous content by cost. This will also ensure that large scale defence production is executed by Indian manufacturing units thereby, generating employment and capability build up within the country.

In order to ensure swift delivery of quality, GRSE has now enhanced its capacity through tie-ups with capable Private Shipyards under the Public Private Partnership (PPP) mode for part construction of ships. Further, these ships are now being built using the 'Integrated Construction' concept through which maximum pre-outfitting is being carried out at the block stage itself.

GRSE is the only shipyard in the country to have built and delivered 105 warships to the Indian Navy and Indian Coast Guard. Two warships built by this shipyard were also exported by the Government of India to Mauritius and the Seychelles. At the moment, GRSE is working on 23 ships. Seven of these are for foreign orders.

Among the larger ships that GRSE is working on now are the Stealth Frigates under the Indian Navy's Project 17A. The shipyard is also building Anti-Submarine Warfare Shallow Water Craft for the Indian Navy. In keeping with the Atmanirbhar Bharat theme, GRSE has achieved nearly 90% indigenization, even for large ships.

gust resistance of 15 m/s. It can operate at 1000 m above the take-off ground and is designed to work at 5500 m ASL.

It's autonomous and electronically stable design makes it suitable for application in Logistics, Search and Rescue, Signal Intelligence and communication intelligence, ISR, Loitering Munition for warhead dropping etc.

Kalyani Strategic Systems Limited will be further developing the platform and enhance its endurance and payload capacity through ISR capability.

# NEWS ROUND UP

## NHINDUSTRIES AND NAHEMA SIGN INNOVATIVE NH90 SUPPORT CONTRACT

**Marignane.** NHIndustries has signed an innovative NH90 support contract with the NATO agency NAHEMA, acting as the contracting authority on behalf of the Direction générale de l'armement (the French Armament General Directorate) and the Direction de la maintenance aéronautique (the French Aeronautics Support Directory) for the French Ministry of the Armed Forces and the BAAINBww for the German Ministry of Defence. This contract will improve the availability rates of the NH90 naval (NFH) and tactical (TTH) helicopters. The NH90 Operational Support (NOS) contract, which will be performance based, will see both nations delegating a major part of their logistics and maintenance activity to NHIndustries, enabling them to focus on their operations. The agreement was also designed in a way that allows additional nations to join at any time. Through the contract, NHIndustries takes full responsibility for ensuring the continuous flow of spare parts to France and Germany through a flight-hour-based service. It will manage the inventories of both nations, while also allocating resources to ensure that scheduled inspections and maintenance run seamlessly. The agreement covers five years of support with two optional extensions of five years each, for a total duration of 15 years. It will serve up to 100 NH90s in France and up to 131 NH90s in Germany. The NH90 military helicopter is a modern, multi-role rotorcraft designed to meet the most stringent NATO standards. Developed in two versions – tactical transport (TTH) and NATO frigate helicopter (NFH) – the NH90 contains a unique, fully integrated mission system for operations in the most demanding conditions over land and sea, day and night. It has been ordered by fourteen nations (France, Germany, Italy, the Netherlands, Belgium, Australia, Finland, Greece, New Zealand, Norway, Oman, Qatar, Spain and Sweden).

## BOOST TO ATMANIRBHARTA: PROCUREMENT OF MILITARY EQUIPMENT, PLATFORMS WORTH RS 76,390 CRORE APPROVED BY DAC

**New Delhi:** The defence ministry, in a significant move to boost Atmanirbharta in Defence approved the procurement of military equipment and platforms worth Rs 76,390 crore from domestic industries. The procurement proposals were approved on June 6 by the Defence Acquisition Council (DAC) chaired by Defence Minister Rajnath Singh for military modernization projects including the Navy's next-generation corvettes. According to the ministry statement, the DAC accorded approval for the procurement of next generation corvettes (NGCs) for the Indian Navy at an estimated cost of around Rs 36,000 crore. These NGCs will be versatile platforms for a variety of roles namely surveillance missions, escort operations, deterrence, Surface Action Group (SAG) operations, search and attack and coastal defence. The NGCs would be constructed based on a new in-house design of the Indian Navy, using latest technology of ship building.

A proposal for the manufacture of Dornier aircraft and Su-30 MKI aero-engines by Hindustan Aeronautics Limited (HAL) with a focus on enhancing indigenisation was also approved by the DAC. The DAC accorded a fresh approval for the procurement of Rough Terrain Fork Lift Trucks (RTFLTs), Bridge Laying Tanks (BLTs), Wheeled Armoured Fighting Vehicles (Wh AFVs) with Anti-Tank Guided Missiles (ATGMs) and Weapon Locating Radars (WLRs) through domestic sources, with an emphasis on indigenous design and development For the Indian Army.

The 'Digital Coast Guard' project under the 'Buy (Indian) Category' was approved by the DAC, in line with the government's aim for digital transformation in defence. This project would develop a pan-India secure network for the digitization of different surface and aviation operations, logistics, finance, and HR procedures in the Coast Guard. "In pursuance of the government's vision for digital transformation in defence, 'Digital Coast Guard' project under 'Buy' (Indian) category has been approved by the DAC. Under this project, a pan-India secure network for digitising of various surface and aviation operations, logistics, finance and HR processes in Coast Guard will be established," the ministry said in its statement. The approval of the capital acquisition proposals of the armed forces in 'Buy (Indian)', 'Buy & Make (Indian)' and 'Buy (Indian-IDDM)' categories will provide the Indian defence industry a big boost. It will also help in reducing expenditure on defence equipment imports.

# THALES TAKES COLLABORATIVE COMBAT TO A NEW LEVEL WITH THE COMBAT DIGITAL PLATFORM

**New Delhi.** Developments in the threat landscape and the nature of conflict call for significant changes in the way that missions are conducted. As the number of actors in the battlespace increases, the digital transformation and advanced connectivity solutions have become an integral part of military operations. Today, Thales is introducing the Combat Digital Platform, a cybersecure platform designed to share, analyse and exploit the vast quantities of available data to guarantee information superiority for the forces deployed in the theatre of operations.

Much more than a command system, the Combat Digital Platform uses artificial intelligence to take collaborative engagements by land forces to a new level. Deployed at every level in the force, from the command centre to vehicles on the front line, the system shares information between sensors and weapon systems continuously and flexibly under the supervision of human operators. Real-time cooperation between the sensors deployed by land vehicles, drones and dismounted infantry significantly improves situational awareness in the battlefield thanks to automated data fusion, processing and analytics.

The system also offers important benefits for joint and allied operations. The Combat Digital Platform is designed to support the conventional tactical command or battle management systems operated by joint forces and alliance partners and to share data securely in compliance with key NATO standards. Information can be assimilated and exploited quickly and securely to accelerate mission preparation and simplify engagements by multiple stakeholders. The ability to share reliable, actionable information across every level of the command chain significantly enhances the interoperability of the forces in the field.

Thales's expertise in mobile connectivity solutions is at the heart of this system. Based on a combat cloud architecture, the Combat Digital Platform provides advanced connectivity services using any combination of software-defined radios, satcoms and LTE mobile networks.1

Some 50 Thales experts worked with end users to design, develop and evaluate the system, drawing on experience from the SCORPION programme to optimise the user experience for real-world battlefield conditions.

# THALES LAUNCHES VISIOLOC® GEOLOCALISATION SYSTEM FOR SOLDIERS ENGAGED IN HIGH-INTENSITY COMBAT

**New Delhi.** The ability to accelerate the OODA loop (Observe – Orient – Decide – Act) is a decisive factor in achieving operational superiority in high intensity combat. Thales is launching VisioLoc® to improve the effectiveness of the augmented soldier without adding to the cognitive and physical burden on the warfighter. The new functionality for the Sophie family of multi-function thermal imagers provides a high-performance geolocation capability and generates precise target coordinates even when no GNSS1 signal is available.

VisioLoc® is a disruptive innovation in the soldier optronics market. Its ability to generate high- precision geolocation coordinates dispenses with the need for fire adjustment procedures, which can currently take up to 20 minutes. Once the section leader has called in fire support, the VisioLoc®function reduces the time it takes for an artillery unit to engage the target by a factor of three or even four. In a high-intensity combat situation, the time savings can be crucial to force protection and effective action against the enemy. VisioLoc® provides leaders of Special Forces units and sections or platoons deployed in forward positions with a high-precision, jam-resistant geolocation function with an equipment weighing less than 3 kg. VisioLoc® can be set up simply (on a tripod or hand-held) in under four minutes and offers an unprecedented level of performance in terms of reliability, precision and readiness for action.

# PARTNERS ARQUUS, THALES AND NTGS PRESENT THE NEW SHERPA A2M AT EUROSATORY 2022

**Paris:** Arquus, Thales and NTGS on June 14, 2022 officially presented the new Sherpa A2M (Advanced Mobile Mortar), during a ceremony organised on Arquus' booth at Eurosatory 2022.

The Sherpa A2M is an adequate answer to the tactical challenges met and created by artillery in the high- intensity warfare: mobility, protection, close support to the troops on the ground and mobile counter-battery options at the fraction of the price of a Self-Propelled Gun (SPG).

The alliance of Arquus, NTGS and Thales allows the application of a truly complete solution delivering a unique indirect fire support solution, suitable for infantry support, collaborative armed forces troops and Special Forces, as well as autonomous artillery units looking for a high level of mobility and protection.

The Sherpa A2M combines the excellent mobility of a Sherpa Light, the proven Deployable Mortar System by NTGS and the 120mm rifled mortar barrel by Thales, into one full fully integrated new solution.

Thanks to Thales capability, the vehicle embeds 120 mm rifled ammunition and in the future the mortar laser guided ammunition. The rifled mortar barrel is three times more precise than smoothbore mortar. Due to this superior efficiency and accuracy, it can achieve similar operational effects with much less shots; around 4 times less rounds needed than for a smoothbore mortar.

NTGS provides its skills in global systems with the fire control system in the back of the vehicle. This system conveys information about targets and points of interest, which represents a significant strategic advantage. Thanks to their expertise, the A2M

Sherpa delivers control across all mission operations and is already combat proven. The mortar and tube from NTGS and Thales are qualified both by NATO and by different armies.

The Sherpa Light is a multipurpose, 4x4 armored vehicle, designed by Arquus to provide with a wide array of versions and customisations for all needs and missions, built on a single, proven base for increased commonality and ease of maintenance. It is a modern, mature, new-generation vehicle, which is built on many years of industrial experience, operational deployments on the battlefield and maintenance. It is protected against ballistic and mine as well as improvised explosive device threats with a STANAG 4569- certified protection, which ensures a high level of safety for the crew inside the vehicle during operations.

The Sherpa A2M can carry 40 rounds of 120mm mortar ammunition in the rear and possibly additional ammunition in the cabin, depending on user requirements. It has a range up to 8.2 km with standard rifled ammunition and up to 13km with a rocket assisted projectile, allowing it to enhance the protection of the embarked soldiers by engaging units without being hit (Shoot & Scoot).

Combining the expertise of these three companies' expertise ensures the highest level of quality for each of the Sherpa A2M's features: protected tactical mobility, ruggedness, superior firepower and accuracy, as well as easy deployable systems and intuitive fire control.

## GE LM2500 MARINE GAS TURBINE TO POWER SPANISH NAVY'S NEW F-110 FRIGATES TO BE BUILT BY NAVANTIA

**EVENDALE, OHIO**. GE Marine is under contract with Navantia to provide five LM2500 marine gas turbines that will power five new Spanish Navy F-110 frigates being built at its Ferrol Shipyard in Spain. These multipurpose, anti-submarine frigates are being co-developed by the Spanish Ministry of Defence and Navantia. Each F-110 frigate will be powered by one GE LM2500 gas turbine and four diesel engines in a Combined Diesel Electric and Gas (CODLAG) propulsion system to achieve a maximum speed of more than 25 knots. The new ships will be used in both blue and littoral waters for fleet protection, maritime security, joint and combined mission, and will replace Santa Maria class frigates. The F-110 frigate program will bring the total to 28 GE LM2500 marine gas turbines used to power Spanish Navy warships.

The LM2500 gas turbines will be made in the USA at GE's manufacturing facility in Evendale, Ohio; the base and enclosures will be manufactured and assembled in Spain by Navantia. With a GE gas turbine, navies have worldwide support whether onshore or at sea, and interoperability benefits with other allied ships. GE has delivered gas turbines onboard 633 naval ships worldwide and provides 95% of the commissioned propulsion gas turbines in the United States Navy fleet. With GE's split casing compressor and power turbine design, in-situ maintenance is allowed, often making a gas turbine removal unnecessary; navies save millions of dollars a year and weeks/months of ship unavailability.

# MAJOR BOOST TO AATMANIRBHAR BHARAT: IAF PLANS TO BUY 114 FIGHTER JETS WORTH ₹1.5 LAC CRORE, 96 FIGHTER JETS TO BE BUILT IN INDIA

**New Delhi:** The Indian Air Force's plan of acquiring 114 Multirole Fighter Aircraft (MRFA) under 'Buy Global and Make in India' will be a big push for the government's Aatmanirbhar Bharat initiative. According to a media agency report, Indian Air Force is planning to acquire 114 fighter jets – 18 would be imported from the foreign vendor chosen for the project and the balance 96 would be built in India by the chosen vendor's Indian partner.

"Recently, the Indian Air Force held meetings with the foreign vendors and asked them about the way they would carry out the Make in India project," government sources told the media agency.

According to the sources, as per the plan, after the initial 18 aircraft are imported, the next 36 aircraft would be manufactured within the country and the payments would be made partially in foreign currency and Indian currency. The last 60 aircraft would be the main responsibility of the Indian partner and the government would make payments only in Indian currency.

The payment in Indian currency would help the vendors to achieve the over 60 per cent 'Make-in-India' content in the project, the sources said. Global aircraft manufacturers including Boeing, Lockheed Martin, Saab, MiG, Irkut Corporation and Dassault Aviation are expected to participate in the tender. The acquisition of 114 fighter jets is important for IAF to maintain its superiority over the neighbouring rivals Pakistan and China.

During the Ladakh crisis which started in 2020, the 36 Rafale aircraft procured under emergency orders helped immensely in maintaining an edge over the Chinese but the numbers are not enough and more such capability would be required by IAF. Though IAF has placed orders for 83 of the LCA Mk 1A aircraft, it still requires a higher number of capable aircraft.

The fifth-generation Advanced Medium Combat Aircraft project is moving ahead at a satisfactory pace but it will take a lot of time to be able to be inducted in an operational role. The IAF is highly satisfied with the operational availability of the Rafale fighter jets and wants similar capability in its future aircraft. Looking for a cost-effective solution for its fighter jet requirement, IAF wants a plane that is low on operational cost and gives more capability to the service, the sources said.

# NEWS ROUND UP

## A STEP TOWARDS GREEN SHIPPING: MAZAGON DOCK LAUNCHES FCEV

**Mumbai:** Mazagon Dock Shipbuilders Limited (MDL) in a step towards achieving green shipping, successfully launched Fuel Cell Electric Vessel (FCEV) prototype. Conceptualized and developed by MDL with technology partners – Tata Advanced Systems Ltd & Vijai Marine Services Pvt Ltd, it is the very first hydrogen boat prototype. The FCEV will use a green hydrogen cell system and the vessel is a 6 passenger boat. According to an official statement of MDL the boat is fitted with a 6 KW Electric OBM, a 10.2 KWH Battery Fuel Cell System and has the capability to run for almost 22 hours with compressed Hydrogen filled in PESO approved Cylinders. Hydrogen fuel cell systems have zero toxic emission, few moving parts with low heat and acoustic signature.

The shipyard MDL is well known for building Scorpene class submarines in joint collaboration with French company NAVAL Group and delivering it to the Indian Navy. Now, the shipyard has developed the Fuel Cell based Electric Vessels, setting an example of how innovation can save the planet and adopting sustainable cost-effective alternate fuel.


At the launch event, Chairman and Managing Director VAdm Narayan Prasad (IN Retd.), MDL, Cdr Jasbir Singh (Retd.), Director (Submarine and Heavy Engineering), Sanjeev Singhal, Director (Finance), Biju George, Director (Shipbuilding) and Cdr Vasudev Puranik (Retd.), Director (Corporate Planning and Personnel) were present along with the senior executives from Tata Advanced Systems Ltd. and MDL. Earlier this year, keeping in pace with Global Maritime Transitions, Cochin Shipyard Ltd (CSL) was identified by the Ministry of Ports, Shipping and Waterways to develop the country's indigenous Hydrogen Fuelled Electric Vessels. It has partnered with KPIT Technologies Limited and Indian Register of Shipping for developing rules and regulation for such vessels. The vessel being built at CSL is expected to come around Rs

## ARMY RELEASES RFI FOR NIGHT VISION

**New Delhi:** Northern Command, Indian Army has released a Request for Information (RFI) for the procurement of Digital Night Vision Goggles (DNVG).

Tonbo Imaging, a firm based out of Bengaluru, designs, develops, and deploys sensing solutions that can see beyond the visible, process complex data for enhanced situational awareness and control dynamic environment for rapid decision making and increased autonomy. The solutions cater to critical market needs in security, defence, reconnaissance, and intelligent transportation and logistics. Tonbo could well be the go to source for hi-tech vision equipment for the armed forces.

FBNVG is a MIL qualified lightweight, fused binocular night vision goggles integrated with the latest generation night vision tubes and state of the art high resolution thermal imager with optical sensor fusion.

The goggles support Image Intensifier only, TI only or a Fused Mode. The goggles can also be operated in an AR Display mode with video output from Tonbo's Spartan-S Thermal Weapon Sight.

Duvi-B is a compact, helmet mounted dual sensor fused Night Vision Goggle (DNVG). Duvi-B is binocular and has an inbuilt processor that digitally fuses video

# PROTOTYPE

17.50 crores and according to the information available in the public domain, 75 percent of this cost will be funded by the centre.

Hydrogen Fuel Cell Vessel, also termed as Fuel Cell Electric Vessel (FCEV) is based on Low Temperature Proton Exchange Membrane Technology (LT-PEM). The technology is environment friendly, with zero emission, and direct current (DC) power source is now being developed for marine application. This technology has higher efficiency when compared to combustion engines and allows energy to be concentrated more densely than in petroleum fuels. It has several applications and can be used not only in transportation but in material handling, emergency backup power applications, and stationary, portable, and emergency backup power applications.

# GOGGLES

feeds from the thermal imager and low lux imager in real time giving soldiers the ability to select clear/day view, thermal view or Fused view.

Digital Fusion eliminates critical design flaws seen on optical fusion technology when dealing with targeting system such as ghosting, image alignment and fusion picture sub setting etc. It provides the dismounted war fighter exceptional day/night capability to detect potential threats in adverse battlefield conditions while providing high fidelity situational awareness required for user mobility, rapid target assessment and engagement.

Tonbo also manufactures a wide range of products which could enhance the surveillance and reconnaissance possibilities for the Indian Army.

# ARMED FORCES TO BUY OVER 4,800 SNIPER RIFLES WITH 78 LAKH ROUNDS OF AMMUNITION, FRESH PROCESS STARTED WITH RFI

**New Delhi.** After the defence procurement board last month accorded the Acceptance of Necessity (AoN) for the procurement, the Indian Armed Forces have initiated a fresh process to buy over 4,800 sniper rifles at a cost of more than Rs 450 crore. In a Request for Information (RFI) published on June 28, the Army said that around 4,800 .338 sniper rifles with telescopic sight will be procured under the "Buy Indian" category along with 78 lakh rounds of ammunition. The new sniper rifles will use the .338 Lapua Magnum ammunition and will have a range of 1,200 metres or more, as per the RFI. They should have a service life of minimum 10 years or 5,000 rounds and the ammunition should also have a shelf life of 10 years. According to defence sources, around 4,500 sniper rifles will go to the Army, over 200 to the Indian Air Force and the rest to the Navy. The RFI states that the Request for Proposal (RfP) for the procurement would be tentatively issued by September this year.

For the past five years, the Army has been trying to get new advanced sniper rifles to replace the ageing Soviet-era 1963 vintage Dragunov sniper rifle, which is in use with the Army since the 1990s. The recent RFI marks the latest attempt of the defence forces to buy the long-range weapon amid increased threats of sniper attacks, particularly at the Line of Control, and to gain a tactical advantage over the enemy from a distance.

The Defence Acquisition Council headed by defence minister Rajnath Singh had cleared the purchase of 5,700 high-precision sniper rifles at an estimated cost of Rs 982 crore under the "Buy Global" categorisation in 2018. The defence ministry had then said their ammunition will be subsequently manufactured in India. An RfP for the purchase of 5,700 sniper rifles floated subsequently was scrapped in June 2019 due to lack of enough responses from firms, who could manufacture their ammunition as well, and after the technical evaluation committee declared the vendors as non-compliant. The Northern Command in 2019 — using the Commander's special financial powers — procured two new sniper rifles in limited quantities. This included the Barrett M95 .50 BMG from the United States and Beretta Victrix Scorpio TGT from Italy, with .338 Lapua Magnum cartridges. Subsequently, the Army also made an emergency procurement of limited quantity of the Finnish Sako .338 TRG-42 sniper rifles last year. The rifles have already been inducted by the snipers at the LoC.

As per the defence sources, a revision of the requirement was carried out after specific quantities of various advanced sniper rifles were bought under emergency routes and by way of using special powers. "The requirements were revised after some other advanced sniper rifles were inducted in the interim period. As the troops have been using .338 Sako sniper rifles, the latest RFI decided to go with the same requirement," a source said. The source added that the range of the Dragunov sniper rifles, which uses a 7.62×54 mm rimmed cartridge, is 600-800 metres. "The new sniper rifles will have a range over a kilometre," the source added.

According to sources, the requirement of the sniper rifle also stemmed from an increased requirement of high-precision long range weapons, especially for counter-insurgency and counter-terror operations as the weapons can deliver a lethal blow on the enemy by surprising him, while letting the sniper remain anonymous and also without escalating tensions.

# IN NEWS

## IAI DELIVERS FIRST SETS OF F-16 AEROSTRUCTURES, 200TH F-35 WING SET TO LOCKHEED MARTIN

**Tel Aviv:** Israel Aerospace Industries (IAI) delivered Lockheed Martin, the first sets of F-16 aerostructures manufactured at IAI's recently reopened assembly line, including the F-16 Conformal Fuel Tanks. In addition, the 200th F-35 fighter aircraft wing set, produced by IAI, was also delivered.

IAI is scheduled to produce a total of 811 pairs of F-35A wings, with a potential value of over $2 billion by 2034, following a contract signed in 2011. IAI is operating a state-of-the-art F-35 wing production line, inaugurated in 2014, while continuously investing in automated systems, advanced infrastructures and technologies necessary to meet the aircraft's innovative design. The wings' upper and lower skins are made of composite materials, unique to the F-35, also made by IAI as part of the production contracts. IAI has been manufacturing aerostructures for Lockheed Martin since the 1980s. With the new demand for the F-16 Block 70/72 aircraft, IAI recently reopened the assembly lines for the F-16 Wings, Vertical Fins and Conformal Fuel Tanks. Prior to reopening the F-16 assembly lines, IAI invested in modernizing infrastructure, improving the work environment, and introducing new tools to produce fully compliant F-16 aerostructures. IAI also successfully re-established the supply chain of hardware suppliers to support the assembly lines, checked and verified tooling, carried out necessary first article inspections, and conducted training programs for the F-16 team.

## INS GOMATI DECOMMISSIONED THE NAVAL DOCKYARD IN MUMBAI

**Mumbai/ New Delhi:** Having served the nation and the Indian Navy with great distinction for 34 eventful years, INS Gomati was decommissioned at sunset at the Naval Dockyard in Mumbai on May 28, 2022, in an elegant, solemn and poignant ceremony. The ship was paid off under the command of Captain Sudip Malik. INS Gomati derives her name from the vibrant river Gomti and was commissioned on April 16, 1988 by Defence Minister KC Pant, at Mazgaon Dock Ltd. The third ship of the Godavari class guided-missile frigates, INS Gomati was also the oldest warrior of the Western Fleet when decommissioned. During her service, she participated in Operations Cactus, Parakram and Rainbow, and several bilateral and multinational naval exercises. For her remarkable spirit and stellar contribution to national maritime security, she was twice awarded the coveted Unit Citation, once in 2007-08 and again in 2019-20. After her decommissioning, the ship's legacy will be kept alive in an open air museum being set up on the picturesque banks of the eponymous river Gomti in Lucknow where several of her combat systems will be displayed as military and war relics.

## SCHIEBEL CAMCOPTER® S-100 PERFORMS MARITIME SURVEILLANCE FOR EMSA IN ROMANIA

**Vienna.** After the successful operations in 2021, Schiebel's CAMCOPTER® S-100 is once again supporting the Romanian Border Police. The operations started in March and are scheduled to continue until August 2022. The Remotely Piloted Aircraft System (RPAS) service is delivered by the European Maritime Safety Agency (EMSA). Stationed in Mangalia, the CAMCOPTER® S-100 supports the Romanian authorities in carrying out general coast guard functions, conducting day-to-day monitoring and surveillance of all shipping, including port security, as well as responding to any search and rescue, accident and disaster calls. Romanian Border Police planned 50 missions during the first two months in Romania and the S-100 has flown more than 170 hours so far. The S-100 executes these various tasks equipped with an L3 Wescam Electro-Optical / Infra-Red (EO/IR) camera gimbal, an Overwatch Imaging PT-8 Oceanwatch, a Becker Avionics BD406 Emergency Beacon Locator and an Automatic Identification System (AIS) receiver.

# NEW CV90 COMBAT SUPPORT VEHICLES DELIVERED TO NORWAY

**Oslo:** The first four CV90 Combat Support Vehicles were delivered to the Norwegian Armed Forces during a ceremony hosted by local industry partner Ritek AS in Levanger, Norway. The four vehicles are the first of 20 modernized CV90 engineering vehicles BAE Systems will deliver, in partnership with Ritek and the Norwegian Defense Materiel Agency. Partnering with the Norwegian defense industry was a key factor in getting the contract signed and the vehicles into production quickly, under measures implemented by the Norwegian parliament to support the country's economy through the challenges posed by the coronavirus pandemic.

BAE Systems serves as the main supplier, while Ritek plays a central role in purchasing, logistics, final assembly, and integration. Ritek has also been responsible for coordinating the project and growing the participation of Norwegian industry. As a result, about 20 Norwegian companies are now qualified suppliers of products and components for the CV90 vehicles, and an integral part of BAE Systems' Norwegian supply chain. The close cooperation between all parties has broadened Norway's overall national capacity in the defense vehicle space and its preparedness to support the vehicles. The Norwegian CV90 fleet is fully digitalized, and among the most advanced combat vehicles in the world.

The delivery ceremony coincided with the completion of Ritek's new assembly hall for the CV90 project, which increases the total workshop area to 5,500 square meters. The hall is designed to meet all requirements for lifting capacity and flexibility in Ritek's existing defence-related project portfolio and for future projects.

# AERONAUTICS TO OFFER VTOL KIT FOR ORBITER 4 UAV, BOOST ITS MISSION CAPABILITIES WITH FLEXIBILITY

**Tel Aviv:** The growing demand for VTOL UAV have brought Israeli company Aeronautics to offer its Orbiter 4 UAV with a VTOL kit. The VTOL kit provides superior mission capabilities and offers maximum flexibility for all-terrain mission success. The operational forces will, for the first time, be able to adjust the Orbiter 4 for optimal mission profiles whenever and wherever required. The operator can select whether to take-off and land the UAS using a traditional Orbiter 4 (launcher and parachute) and to benefit from outstanding endurance of 24 hours, or to attach the VTOL kit for accurate take-off and landing with reduced endurance. Last year, Aeronautics unveiled a maritime capability of its Orbiter 4. According to the company, the Orbiter 4's high-performance EO/IR and MPR payloads are ideal for maritime monitoring, gas and oil rigs protection, illegal activity tracking, and search & rescue. It has already been fully integrated into the operational environment of navy vessels, and meets the requirements of navy operations. Based on the successful aerodynamic structure and properties of the Orbiter 3 STUAS, the Orbiter 4's exclusive abilities include endurance of over 24 hours, and the ability to carry and operate multi payloads simultaneously.

# GURUTVAA SYSTEMS WINS BHUMI – BSF GRAND CHALLENGE 2022 AWARD

**New Delhi:** The Ministry of Electronics & Information Technology (MeitY) & BSF named Gurutvaa Systems Pvt Ltd. the winner of the 2022 BHUMI (BSF HIGH-TECH UNDERTAKING FOR MAXIMIZING INNOVATION) Challenge Award on June 3 at the BSF Investiture Ceremony held at Vigyan Bhavan, New Delhi. The award recognizes the contribution of Gurutvaa Systems towards development of impactful solutions in Counter Drone Systems to address the specific problem statement of BSF. To leverage the innovations created by the Indian entrepreneurs and to build on the mission of Atmanirbhar Bharat, Border Security Force (BSF) seeks to organize Hackathons with Indian startups and premier Institutions for cost effective solutions to strengthen the border security scenario. In compliance to the directions, Ministry of Electronics & IT Startup Hub (MeitY Startup Hub) is collaborating with BSF to provide access to the platform, resources, startups, and institutions which can be engaged in this process of solution identification based on problem statements as provided by BSF. Gurutvaa Systems Pvt Ltd (GSPL) based out of Pune specializes in Gyroscopes, Accelerometers, Inertial Systems, Radar, RF Components & Defence Electronics. Incorporated in 2014 with the objective to meet requirements for the various services i.e., Air, Land & Naval Systems, GSPL is a registered supplier to the Indian Air Force (IAF) and has recently commenced supply of DRONAAM Counter Drone System to IAF for which it had received an order in 2021. GSPL is also a registered supplier to the Base Repair Depot (BRD) and Bharat Electronics Ltd (BEL).

# IN NEWS

## IIT-JODHPUR DEVELOPS 3D PRINTER FOR WIDE APPLICATIONS

**Jodhpur:** In a boost to the defence sector, the Indian Institute of Technology (IIT), Jodhpur have developed a metal 3D printer for aerospace, defence and general engineering applications. All the components of the 3D printer are designed and manufactured in India, except the laser and the robot systems. "The objective to develop the printer is to reduce the cost of metal 3D printers and attract a broader range of users", said a statement by an official. Despite the fact that metal 3D printing technology started a few years after the launch of Polymer 3D printing, it is yet to experience the tremendous growth that the polymer 3D industry has achieved, especially in India. India's first state-of-the-art variable spot size laser optics without compromising on laser beam homogeneity for laser cladding and additive manufacturing process is available in this machine.


## BEL GETS FRESH ORDERS FOR SWATHI MARK-II WEAPON LOCATING RADAR

**New Delhi.** Indian Army has placed orders for six units of Swathi Mark-II Weapon Locating Radar with Bharat Electronics Limited (BEL) with an estimated cost of Rs 400 crores. Mark-II is high altitude optimized variant of the Swathi Weapon Locating Radar that has been cleared after going through a fresh round of trials in the mountain terrain according to reports. Swathi Mark-II Weapon Locating Radar has been developed by the Electronics and Radar Development Establishment (LRDE) that is mounted on a BEML-manufactured 6×6 truck instead of the baseline Swathi that is mounted on an 8×8 heavy-duty truck for easier operations in the mountain terrain. Swathi Mark-II also has some performance improvements over its predecessor which likely will translate into more orders in near future coming from the Army for the new variant. Indian Army already has procured 30 units of the earlier variant of Swathi that are positioned across the Line of Control (LoC), Mark-II was developed on Army's request for Weapon Locating Radar that has a lighter footprint in the mountain terrain.

## INDIGENOUS IPMVS INDUCTED IN FORWARD AREAS

**New Delhi:** In a boost to indigenous defence industry and to government's Atmanirbhar Bharat, Made-in-India Infantry Combat Vehicles have been inducted into the forward areas in Ladakh boosting the capabilities of the troops deployed there. Northern Army Commander Lt General Upendra Dwivedi personally drove the new vehicle and said that with these combat vehicles one can easily drive in harsh terrain of the region. "One can easily drive the vehicle and the driver can see 1,800 metres away from it. The weapon mounted on it can be controlled from inside," Lt General Dwivedi said. The vehicles named Infantry Protected Mobility Vehicles (IPMVs) were delivered to the Indian Army in April this year and have been tried and tested in the Ladakh region in mountainous terrain.

## INDIA DEVELOPING 300 KM RANGE ASTRA MISSILE

**New Delhi:** In keeping with its policy of Atmanirbharta or self-reliance in defence, India which imposed a phased ban on the import of 310 different types of weapons and systems during the last two years is developing two advanced variants of the Astra beyond visual range air-to-air missiles, with one of them capable of striking targets at a range of 160km, when ready, and the other at almost 300km, media reports said quoting top government sources. The Astra MK-2 and MK-3 missiles are likely to be tested next year and in 2024 respectively, and are among the Defence Research and Development Organisation's (DRDO) key ongoing programmes, said one of the sources. The current Astra MK-1 variant has a range of around 100 km. The defence ministry on May 31 signed an Rs 2,971-crore contract with Bharat Dynamics Ltd (BDL) to equip the Indian Air Force and Indian Navy with Astra Mk-1 missiles and associated equipment, which was seen as a shot in the arm for "Atmanirbharta", or self-reliance, in the defence manufacturing sector. DRDO has transferred technology to BDL for the production of the Astra Mk-1 and associated systems.

# IN MAKING INDIGENOUS ANTI-TANK MISSILE, HYDERABAD FIRM PLAYS A KEY ROLE

**Hyderabad:** India's The first indigenous anti-tank missile 'Asibal' conceptualised, designed and manufactured in the private sector is going to be manufactured at the city-based VEM Technologies upcoming integrated defence systems facility at National Investment Manufacturing Zone (NIMZ) at Zaheerabad in Sangareddy district, about 120 km from the capital.

"It is a dream come true for me to establish an integrated defence systems manufacturing facility within nine months of having a pact with the Telangana government. It could be the among the biggest in the private sector and if everything falls in place, we could have one million sq.ft work space ready by 2024-25 to begin operations," he said. VEM Tech is part of the Centre's 'Make in India' scheme and is into "every vertical" like electronics, sensors, servo systems, rocket systems, onboard computers, three types of infra-red, laser and RF seekers, missile systems, etc., with its first facility functioning at Shamshabad.

The 56-year-old entrepreneur said it is proposed to have 1,000-foot long hangar facility to develop the main fuselage for the Light Combat Aircraft and also develop the airframe for the Advanced Medium Combat Aircraft.

A joint venture is proposed to be taken up with a US-based firm for making long range sniper rifles and a drone system with another foreign firm. "By 2029, our firm intends to develop some level of integrating a fighter aircraft. We have orders worth up to Rs 1,000 crore," disclosed Raju.

The firm eventually plans to have 20 million sq. ft built up space with 40 km of internal roads and green cover with 10,000 saplings across the 511-acre space. "We will not have any township as it is a defence set-up," he explained.

"All this is the result of sacrifices by my family. It is not easy to be in defence field as we have to have knowledge, technology and compete with the best in the world. We have invested every penny into this company," smiles the soft spoken Raju, who started as a trainee in a Patancheru unit in the 80s.

# GOVERNMENT UNVEILS RADICAL ARMED FORCES PLAN "AGNIPATH"

**New Delhi:** In what is being seen as a radical and transformative recruitment plan for the armed forces, the government June 14 unveiled the Agnipath scheme, which is aimed at cutting down salary and pension bills and freeing up funds for urgent procurement of weapons. Announcing the launch of the scheme in the presence of the three service chiefs here, Defence Minister Rajnath Singh said it was a "historic" decision. Defence Minister Rajnath Singh provided details of the new initiative at a media briefing shortly after the Prime Minister-led Cabinet Committee on Security approved the scheme. He said that "Under the 'Agneepath' scheme, Indian youth will be provided an opportunity to serve in the armed forces as 'Agniveer'. This scheme has been brought to strengthen the security of the country. It is a transformative scheme."

Under the scheme, about 45,000 people between the age of 17.5 years and 21 years will be inducted into the services for a four-year tenure. The recruitments will begin within the next 90 days and the first batch will be ready by July 2023. Those selected for the scheme will be known as Agniveers. The selection will be made through an online centralised system, the government said. Educational qualification for Agniveers will be the same as the criteria for regular positions in the force. Women will also be inducted under the Agnipath scheme, Navy chief Admiral R Hari Kumar said. Army Chief General Manoj Pande said Agniveers will be fully assimilated and integrated into the services. Air Chief Marshal V R Chaudhari said the new scheme gives the IAF an opportunity to draw from the vast pool of talent and train and expose them to the high tech environment and hone their skills for future employment. This four-year tenure will include a six-month training. During this period, they will be paid a monthly salary between Rs 30,000-40,000 plus allowances. They will also be entitled to medical and insurance benefits. After four years, only 25 per cent of these soldiers will be retained and they will join the regular cadre and go on to serve for a full 15 years in non-officer ranks. The remaining will exit the services with a package between Rs 11 lakh -Rs 12 lakh, but they will not be eligible for pension benefits. The forces announced that provisions have been made for loss of life or disability due to an injury on duty. The scheme, if successful, will drastically cut the annual revenue and pension bill which accounts for half of the annual defence budget of Rs 5.2 lakh crore.

# HYPERSONIC MISSILE TO BOOST TO INDIA'S DEFENCE, EXPECTED TO BE IN ITS ARSENAL IN NEXT SIX YEARS

**New Delhi.** Indian defence would get a major boost within five to six years as the nation's first hypersonic missile would be part of the country's arsenal, said BrahMos Aerospace CEO and MD Atul Rane. "BrahMos Aerospace is capable of making hypersonic missiles. In five to six years, we will be able to have our first hypersonic missile by BrahMos," he said at an event to launch the 'Silver Jubilee Year' celebration (1998-2023) to mark the incredible journey of BrahMos military partnership programmes producing cruise missile BRAHMOS. The 'Silver Jubilee Year' celebrations would began on June 12 and would end on February 12, 2023, on 'BrahMos Raising Day.' The celebrations will include several key events, meets, and competitions at the national level. India successfully tested Hypersonic Technology Demonstrator Vehicle (HSTDV) in September last year by integrating scramjet engine technology. The HSTDV technology will be assisting the country to develop futuristic space assets like long-range missile systems and aerial platforms. The HSTDV is capable of powering missiles to attain a speed of around Mach 6 or six times the speed of sound. Very few countries like the US, Russia and China have such a capability. India not only has armed the three services with the BRAHMOS Missiles but has also started exporting it. As per the initial deal, The Philippines will get three missile batteries of missile system which has a range of 290 kilometres and a speed of 2.8 Mach (thrice the speed of sound). India has been in talks with Indonesia, Vietnam and Thailand and few other nations that have shown interest in the system.

# IN NEWS

## A400M: AIRBUS SUPPORTS GERMAN AIR FORCE TRANSFORMATION TO SUSTAINABLE AVIATION FUEL

**Berlin.** Airbus is supporting the German Air Force in their long-term transformation to increase sustainability of its aircraft fleet. Airbus is working with the German Air Force towards providing the Luftwaffe with a technical allowance to commence national A400M flight trials with loads of up to 50 percent Sustainable Aviation Fuel (SAF) in the near-term. SAF is a proven alternative fuel that can reduce life cycle CO2 emissions by up to 85 percent compared to conventional fuel. By that, Germany, which has a total of 53 units on order, is becoming the first customer nation to launch a gradual transformation to SAF for their operational A400M fleet. Besides supporting national customer activities, Airbus has embarked on a long-term roadmap towards achieving 100 percent SAF readiness and certification for the A400M. As a first step, in 2022, Airbus plans a test flight of an A400M aircraft with a fuel load of up to 50 percent SAF. This initial test flight will be conducted with one engine to better assess the aircraft's overall behaviour. Upon successful completion of this one-engine flight, Airbus is expecting to continue with four engine trials in 2023.Once testing activities are completed on the basis of four engines, the A400M platform will formally be allowed for customers with access to 50 percent SAF. Furthermore, Airbus, OCCAR and the A400M Nations are engaged in initial discussions to develop the roadmap towards the certification and operational use of 100 percent SAF. Earlier in 2022, Airbus Defence and Space performed the first flight of its C295 Flight Test Bed, a Research & Development project of the European Clean Sky 2, which aims at the use of new technologies and materials to achieve noise, CO2 and NOx reductions.

## CAMERO UNVEILS XAVER 1000 - THE LATEST VERSION OF MICRO-POWER RADAR 'THROUGH WALL IMAGING' SYSTEMS

**Tel Aviv:** One of the Israeli made anti-terror tools has become more effective. Israeli company Camero has unveiled its Xaver™ 1000 the latest version of the company's pulse-based micro-power radar 'Through Wall Imaging' systems. The Xaver™ 1000 has an AI-based tracking algorithm of live targets and its own 3D 'Sense-Through-The-Wall' capability, enabling it to detect and 'see' people or static objects behind walls and obstacles. Live objects can be seen in high resolution down to the level of specific body parts. This includes whether an object is sitting, standing or lying down, even after they have been stationary for a long period of time. The system also enables users to measure the height of objects and decide whether they are adults, children, or animals, resulting in a clear operational advantage and the ability to 'step into the known'.

## BOEING AND ROSSELL TECHSYS PARTNERSHIP GOING STRONG, MARKS COMPLETION OF 100,000 DELIVERIES

**Bengaluru:** Rossell Techsys partnership with Boeing is going strong and with the completion of 100,000 deliveries on June 7 to Boeing for its various platforms, including 50,000 deliveries for the Apache platform alone, another delivery milestone was achieved.

The strategic partnership continues to strengthen with Rossell Techsys manufacturing wire harnesses and electrical panels for the AH-64 Apache, in addition to wire harnesses for several other Boeing platforms including V-22 Osprey, CH-47 Chinook, F-15 and F/A-18 Super Hornet, T-7 Red Hawk, KC 46A and MQ-25. Rossell Techsys has manufactured these parts at their state-of-the-art Centre of Excellence (COE) facility in Devanahalli, Bangalore. Mr. Torbjorn (Turbo) Sjogren, Vice President, International Government & Defence, Boeing Global Services; Mr. Ashwani Bhargava, Senior Director, India Supplier Management; Mr. Rishab Gupta, Director, Rossell India Ltd., and other Boeing and Rossell Techsys executives were present to mark the delivery milestone. Rossell Techsys, a long-standing partner of Boeing, achieved another landmark milestone, having taken a giant leap from being a start-up company in 2011 to becoming a key supplier in India's 'Aatmanirbhar Bharat' vision, promoting indigenization and self-reliance in defence manufacturing. The company has also partnered with Boeing for its CSR initiatives under "Skill India" and provides opportunities for the differently-abled, all of whom have significantly contributed to this milestone.

# AERONAUTICS UNVEILS FIRST EVER UNMANNED HOVER PLANE - TROJAN

**Tel Aviv:** Israeli company Aeronautics has unveiled the Trojan - an Unmanned Hover Plane (UHP). The company is proud to introduce Trojan that according to the company bridges the gap between the need to hover and the need to reach long ranges. The new UHP category is a game changer, due to its ability to perform aerial missions with pinpoint precision. The system's capabilities support challenging operational missions while simultaneously performing point-to-multipoint Intelligence, Surveillance and Reconnaissance (ISR), thereby creating a solution for versatile and dynamic environments, and achieving Wide-Area-Persistent-Surveillance (WAPS). The system's multi-platform architecture utilises multiple sensors, together with advanced analytics capabilities, to ensure accurate, reliable, real-time situational awareness. The revolutionary UHP configuration gives Trojan long endurance - 2.5-hour flight time, long-range - up to 150 km, and fast flight capabilities, combined with the capacity to carry multiple payloads up to 12 kg in weight, all packed into a small tactical platform. The system enables execution of demanding, complex missions by tactical base stations, each of which control up to four platforms, simultaneously. Each platform, in face of a battle scenario can channel and produce sensor data which can optimize the mission's performance. Trojan has been designed to enable operations in harsh environments - characterised by adversary operations, day and night operational activity and extreme environmental conditions - while maintaining high efficacy within a small footprint. The UHP's Ground Control Station (GCS) is controlled via a user-friendly interface and can be safely operated by a single operator. Collecting field information, it supports mission planning and monitoring in all operational modes, and payload control.

# IIT-M & GE JOINT INNOVATION PROGRAM PRODUCT ENTERS TESTING PHASE AT NATIONAL AEROSPACE LABORATORIES

**Bangalore.** A product developed by IIT Madras (IIT-M) and GE Aviation (GE) under a joint innovation program started in 2016 has now entered the testing phase. The locally designed and developed aviation high-speed Micro Turbomachine is being tested at National Aerospace Laboratories (NAL), an important step towards technology maturation. During the product design process, GE and IIT-M engineers and researchers worked together to develop a local aviation supplier ecosystem for the manufacture of high-precision and high-speed turbomachinery that adhered to global aviation industry manufacturing standards. Two local aviation industry companies Pragati Transmission Pvt. Ltd. and Turbocam India Pvt. Ltd. participated in the manufacture and assembly of the prototype. IIT-M and GE signed a memorandum of understanding (MOU) in 2016 to collaborate on research and development. An investment of about Rupees 10 crores (INR 100 Million) over the last five years was funded 75% by IITM through UAY scheme of Government of India and 25% by GE. Under this scheme, a new Micro Turbomachine was designed, manufactured, and being readied for testing in India.

# ROBOTEAM AND SMART SHOOTER UNVEIL INTEGRATED SOLUTION FOR TACTICAL UGV ROBOTS

**Tel Aviv:** Ground robots become lethal. Israeli companies Roboteam, a tactical ground robotic systems and Smart Shooter, manufacturer of innovative fire control systems, unveiled an integrated solution: a tactical ground robot utilising the SMASH technology that ensures precise hit capabilities as well as air defence against drones (C-sUAS). A highly mobile, all-weather system capable of operating in any terrain, Roboteam's Transportable Interoperable Ground Robot (TIGR) is a medium-sized, two-man carried UGV. Incorporating Smart Shooter's SMASH Hopper, a Light Remotely Controlled Weapon Station (LRCWS) with pin-point accurate lethal capability, and the integrated solution enhances tactical forces' lethality and survivability by providing them the ability to hit ground, aerial, moving or stationary targets from a safe stand-off distance. Lightweight, with high manoeuvrability and stair-climbing ability, this solution is ideal for urban scenarios, border control, subterranean and other tactical, operational missions. Platform agnostic, the SMASH Fire Control Systems can also be integrated into Roboteam's other innovative robotic solutions, such as the ROOK Multi-Purpose Robotic UGV and PROBOT Lightweight Heavy-Payload Robot.

# IN NEWS

## DRDO CONDUCTS SUCCESSFUL MAIDEN FLIGHT OF AUTONOMOUS FLYING WING TECHNOLOGY DEMONSTRATOR

**New Delhi:** Defence Research and Development Organisation (DRDO) July 1 successfully carried out the maiden flight of the Autonomous Flying Wing Technology Demonstrator from the Aeronautical Test Range, Chitradurga, Karnataka.

The aircraft operating in a fully autonomous mode exhibited a perfect flight, including take-off, way point navigation and a smooth touchdown marking a major milestone in terms of proving critical technologies towards the development of future unmanned aircraft and is significant step towards self-reliance in such strategic defence technologies.

The Unmanned Aerial Vehicle is designed & developed by Aeronautical Development Establishment (ADE), Bengaluru. It is a premier research laboratory of DRDO. It is powered by a small turbofan engine. The airframe, undercarriage and entire flight control and avionics systems used for the aircraft were developed indigenously.

Defence Minister Rajnath Singh congratulated DRDO and said it is a major achievement towards autonomous aircraft and will pave the way for 'Aatmanirbhar Bharat' in terms of critical military systems.

Secretary, Department of Defence R&D and Chairman DRDO Dr G Satheesh Reddy appreciated the efforts of the teams associated in the design, development and testing of the system.

## DRDO AND PRIVATE FIRMS TO DEVELOP INFANTRY COMBAT VEHICLE

**New Delhi:** Defence Research and Development Organisation (DRDO) is developing two Advanced Armoured Platform (Tracked) (AAP-Tr) vehicles. The project, spearheaded by DRDO laboratory Vehicles Research & Development Establishment (VRDE), is expected to produce a vehicle capable of meeting Indian Army's requirement for over 1,750 Futuristic Infantry Combat Vehicles (FICV). Two AAP-Tr technology demonstrators and four 30mm unmanned turrets will be developed by VRDE in association with an industry partner. The amphibious vehicle will be powered by an engine rated at 600-750hp with protection in the form of modular armour. The 25 ton vehicle will have provisions for integrating an Active Protection System (APS), loiter munitions and a mini UAV. These are required to meet specifications for FICV released by the Army in a 2021 RfI. The vehicle must be designed to mobility and dimensional specifications stated by VRDE and will have a crew of three. The crewless turret for AAP-Tr will consist of a 30mm gun, 7.62mm coaxial machine gun, a 12.7mm remote controlled weapon station and ATGM launchers. Various sights and a fire control system will also be integrated. Four ATGMs are proposed to be housed in two twin launchers. The ATGM preferred is the Nag Mk2, which is under development.

## INDRA TO EQUIP NORWEGIAN AND GERMAN NAVY SUBMARINES WITH NEXT-GENERATION SYSTEMS

**Madrid.** Indra, a leading global engineering technology company for the aerospace, defence and transport sectors, has been awarded contracts by Norway's Kongsberg Defence & Aerospace for more than 70 million euros to equip the combat systems of future Type 212CD (Common Design) submarines with intelligent electronic defence systems incorporating state-of-the-art technologies, and low interception probability navigation radars, to ensure maximum capabilities to fulfill every mission and speed up decision-making. The company will equip the four submarines of the Norwegian navy and the two bought by the German navy with a cutting-edge electronic warfare intelligent system based in the wideband interception and analysis of the signals, the use of interferometry to determine the position of potential threats and the digital reception technology for the generation of radar and communications intelligence. Artificial intelligence and machine learning techniques incorporate the capacity to adapt to future threats. The system also has a combined antenna integrated into the mast to optimize the use of the platform. The X band radar represents Indra's investment to equip these submarines with dual continuous wave radars involving high-precision detection pulse and low probability of interception. It is a solid-sate digitized system with a high-frequency agility and bandwidth, able to detect targets with low radar cross-section in the worst electromagnetic clutter conditions, resisting jamming attempts by adversaries. The Indra suite of systems will be integrated with Kongsberg's ORCCA combat system, playing a key role to provide situational awareness above that of adversaries. Indra takes on this project with the experience of having equipped this same submarine model, the Type 212A, with its systems in the earlier version of the one now in operation in the German, Italian and Portuguese Navies. The company now joins a very ambitious international project that allows it to establish a strategic relationship with the Norwegian company Kongsberg Defense & Aerospace (KDA).

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