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EDITORIAL

Ajit Kumar Thakur
Editor & Business Director

NAVIGATING A TURBULENT WORLD

As we usher in the New Year 2024, the atmosphere at *Raksha Anirveda* is one of optimism and positivity. We extend these sentiments to our esteemed readers and patrons, hoping for a resonance of similar positivity. Stepping beyond the mixed experiences of the previous year, we believe this is the opportune moment to unlock the future while navigating the transformative *Amrit Kaal* phase.

In our six years of existence, *Raksha Anirveda* has ascended on a trajectory of growth—steadily and confidently. We have embraced the challenges that came our way, aligning our narrative with the evolving story of Rising India. The success of India's future strides holds profound significance for us, as our journey coincidentally intertwines with the narrative of an ascending nation.

In recent years, we've observed the fading of the old world, making room for an enticing yet unexplored new world. Presently, it appears distant, darker, and divided, with global conflicts challenging the notions of peace and stability. The ongoing Russia-Ukraine and Israel-Hamas wars underscore the complexities of modern warfare, where total victory seems improbable, as triumph can be nearly as perilous as defeat in the present geopolitical landscape.

Warring nations and groups must tread the middle path to prevent further destruction. The looming threat of these wars affecting other regions emphasises the need for global powers to engage actively and neutralise potential economic and strategic pitfalls.

In the midst of a challenging global environment, India's adept and nuanced approach on multiple fronts has proven instrumental in navigating turbulence successfully, positioning itself as a land of promise. Emerging as an economic and technological powerhouse, India's global standing has soared to new heights. This prowess was prominently showcased at the recent World Economic Forum in Davos, emphasising India's significance on the world stage.

The Wings India 2024 event provided a platform to spotlight the remarkable progress of the Indian Aerospace sector, marking its ascension on the global aviation marketplace.

In response to dynamic geopolitical shifts within the rapidly evolving global technology landscape, India has embarked on a journey of reenergising itself. Strengthening strategic partnerships with key nations, including the US, France, UK, and Japan, India is positioning itself as a formidable player in the international arena.

India's enduring partnership and strategic cooperation with Russia are undergoing an adaptive makeover, demonstrating resilience in the face of changing times and uncertainties of the future.

> "India's self-reliance drive in the defence sector is on an upward trajectory, poised to accelerate and make a quantum leap forward"

India's self-reliance drive in the defence sector is on an upward trajectory, poised to accelerate and make a quantum leap forward. Propelled by comprehensive policy and procurement reforms, as well as a commitment to innovation, entrepreneurship, research and development, and skill enhancement, the Indian defence and aerospace sector has matured significantly. This transformation positions India to actively participate in the global supply chain and compete on an international scale. The surge in defence exports from India aptly reflects the evolving dynamics of the country's defence industrial complex.

Amidst the growing geopolitical, strategic, and security challenges, heightened by the Chinese factor in the neighbourhood, India faces a crucial area of concern. India must address these with a new perspective and pragmatic approach, as proactive engagement is vital to fostering political stability and economic progress in the region, aligning with India's vision for 2047.

The January-March 2024 edition brings a rich blend of wide-ranging, relevant, and contemporary topics. Readers can delve into in-depth analyses, a preview of Defence Budget 2024, an engaging book review along with regular columns such as Musings from Russia and Israel Diary adding further depth.

Happy Reading! Jai Hind!

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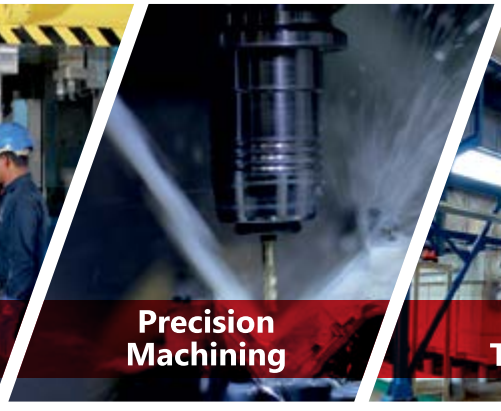

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CONTE

SPECIAL FEATURE

Boosting India-France Strategic Partnership

President Macron's presence at India's 75th Republic Day celebration serves not only as a diplomatic gesture but as a testament to the enduring and multifaceted partnership between India and France

Forging Deeper Connections

LEAD STORY

Multipolarity Looming Over European Partnerships

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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.

INSIGHT

TRACKING THE TRAJECTORY OF AN ASPIRING POWER, SELF-DOUBTING POWER AND ARROGANT POWER

A complex strategic triangle characterised by the cross-pollination of capabilities and intentions, is unfolding through the interplay of India-China relations, the growing US-China rivalry, and the burgeoning India-US strategic cooperation. Thus, it becomes vital to delve into the history of the India-US-China triangle and examine its contemporary evolution. This exploration is essential to comprehend the challenges and opportunities in South Asia, fostering insights for promoting peace and stability in the region

By **BIKKI SHARMA**

India is making significant strides in solidifying its position in the Asian age, particularly by bolstering its armed forces through a robust modernisation drive. Notable investments have been directed towards the Navy and the Air Force, with such key acquisitions as the INS Vikramaditya, INS Arihant, MMRCA, FFGA, Globe Master and Agni V&VI offering a glimpse into the future role of India's military.

There is no doubt that South Asia constitutes an important sub-theatre of the Indo-Pacific region, both on land and at sea. Despite India's position as the primary and dominant power in South Asia due to geography and history, the strategies of a proximate power like China and a distant power like the United States (US) are important in regional geopolitics. Furthermore, we cannot ignore the way the smaller states of South Asia, whether they are in the Himalayas or on the Indian Ocean's littoral, manage their relations with India, the US, and China. In a time when Indo-Pacific tensions loom over South Asia, India-China relations are deteriorating, and US-China relations are falling apart, growing strategic cooperation between India and the US is seen in Beijing with some unease, leading to a complex dynamic of aspiring competition, doubtful cooperation, and arrogant confrontation.

At a time when Indo-Pacific tensions loom over South Asia, India-China relations are deteriorating, and US-China relations are falling apart, growing strategic cooperation between India and the US is seen in Beijing with unease, leading to a complex dynamic of competition, cooperation, and confrontation

In today's world, India and the US have varying degrees of cooperation, competition, and conflict with China. As each country engages China, it prepares for a change in Chinese behaviour. Additionally, both countries acknowledge that China, especially with uncertainty about its behaviour, is partly driving the India-US partnership. In the US, a more substantial relationship with India and support of its rise has been driven by three imperatives: strategic interest, especially in light of China's rise, economic interest, and shared democratic values. Some of the American interest in India is attributed to concerns about China's aggressive rise. In recent years, tensions between the United States and China have introduced new challenges—especially related to economic and defence issues. China is a major trading partner for the United States but it is also developing its military capabilities, which poses challenges to the US congress in drafting a stringent policy towards China in Indo-Pacific. In today's open market economy mainly driven by free trade agreements, the US goods and services trade deficit with China was USD 367.4 billion in 2022. This deficit makes us view the US as a doubtful distant power whose hegemony is being questioned in the Indo-Pacific region. However, an opportunistic China plans to dominate the market securing its economic and interest, while India is aspiring to join the bandwagon of Western nations

with an aim to become a 5 trillion dollar economy. The G-20 summit hosted by India is testimony to this equation.

While the US played its cards of deepening ties with the East in a bid to secure its otherwise doubtful presence in the region, China missing the leaders' summit suggests that it did so to avoid questions regarding its aggressive and confrontational attitude in the geo-political arena. Now, a key part of New Delhi's own China strategy can be towards strengthening India both internally and externally (internal balancing) and building partnerships (external balancing) - and the US will play a key role in both.

REWRITING A COLD WAR STORY

Global geopolitics in the 21st century is dominated by the rise of China and its strategic ramifications, particularly in the Indo-Pacific region. Analysts and policymakers have been paying attention to the dynamic between India and China - two proximate neighbours - given its implications for South Asia, a crucial sub-region of the Indo-Pacific. It makes sense for New Delhi to move closer to Washington as an aggressive and rising China seeks ingress into India's territory and aims to increase its strategic footprint among South Asian countries. However, the emerging contours of US-China rivalry have led New Delhi and Washington to work together towards a strategic partnership, even though the US's placement between the two contending nations is only of a mediator trying to placate both sides securing its national interest. Since 1949, China has remained a major factor in South Asia's power balance. As a result, it has become a major concern for the US' containment strategy in the region. During the early Cold War, India's relationship with China and vice versa, as well as its potential partners in shaping the fate of a post-colonial Asia, played a crucial role.

Consequently, a large Asian country like China going communist was regarded as a failure for US strategy and with the Soviet Union going nuclear in the same year, as well as reverses the US suffered in the Korean War, the threat of communism became a paranoia in US policymaking circles. Despite Indian political leadership and US diplomatic establishment in India's efforts to ease US concerns, there was apparent fear among the US government of newly independent Asian countries like India turning towards communism. According to the US government, ensuring India's success, as a new nation-state, would serve as a good example of democracy in contrast to communism.

NAVIGATING THE INDIA-US-CHINA TRIANGLE TOWARDS REGIONAL STABILITY

As the multi-polar era grows, new terms of engagement between the US and its adversaries and partners have emerged. The US and India are stitching a closer strategic partnership, but independent powers like India have their unique worldview and intend to practice their strategic

China's security partnerships with India's neighbours influence India's strategic thinking because India and China are two proximate powers. Considering this looming shadow of the Indo-Pacific complex, the implications of China's rise in South Asia are more relevant for a distant and equivocal power like the US

INSIGHT

With China's increasing economic and strategic interest in South Asia, such as through the BRI, the neighbourhood has played a key role in India's foreign policy calculations. To counter China's influence in South Asia, the US should pay attention to South Asia's response to China's BRI

autonomy. Similarly, both Washington and New Delhi wish to preserve their sense of competition-cooperation balance with Beijing. This triangular interaction is influenced by geography amid power competition. Additionally, Chinese development and security partnerships with India's immediate neighbours influence India's strategic thinking and operations because India and China are two proximate powers. Considering this looming shadow of the Indo-Pacific complex, the implications of China's rise in South Asia are more relevant for a distant and equivocal power like the US.

With China's increasing economic and strategic interest in South Asia, such as through the Belt and Road Initiative (BRI), the neighbourhood has always played a prominent role in India's foreign policy calculations. And in order to counteract China's influence in South Asia, the US should pay attention to South Asia's response to China's BRI. Washington cannot match China's investments in the region dollar for dollar, but it can provide alternatives along with a partner like India. An approach like this is also beneficial to India, who may not have the capability to provide public goods in South Asia.

REGIONAL IMPLICATION

As the India-US-China triangle and its interactions with regional permutations and combinations continue to evolve, New Delhi and Washington need to explore new and important areas of cooperation. Connectivity and infrastructure projects in South Asia are one of them requiring acute assessment and near-term implementation, given China's inroads in the area. It is important that the US pays attention to the development gap in South Asia and collaborates with India, which understands what the region needs but may lack the material resources to build a viable strategy for the region.

However, a key concern for India was the cooperative aspects of Sino-US relations and thus chose to hedge between China and the US And with the US identifying China as a strategic competitor, India has increasingly embraced the Quad and leaned toward the US. As the US's Indo-Pacific strategy leaves China facing two-front challenges, China's security concerns about India have largely increased. Although smaller South Asian countries appear to be a balancing factor between India and China, the US's growing Indo-Pacific rivalry cannot be dismissed.

Thus, to understand regional dynamics, India, the US, and China triangle merits the study with its roots in the early Cold War. Within the triangle, both capabilities and intentions influence perceptions and misperceptions. Resultantly, Indian power asymmetry compared to Chinese power and Chinese power gap compared to US power drive each state's regional posture and trajectory.

–The writer is a professional and experienced writer having worked with multiple organisations. He is a keen observer of global affairs, geopolitics and how it affects the world order. The views expressed are of the writer and do not necessarily reflect the views of ***Raksha Anirveda***


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IS OUTER SPACE THE NEW DOMAIN FOR WARFARE?

The outer space offers endless possibilities as the battleground for future combat. There is a strong possibility that future conflicts on Earth could extend into space

By **NEERAJ MAHAJAN**

On November 9, 2023, for the first time, Israel's most advanced air defence system, the Arrow 3, successfully intercepted a Ghadr-110 missile heading towards the country's southernmost city of Eilat.

On October 31st, 2023, an Israeli Arrow 2 anti-missile system intercepted a ballistic missile launched by Houthi rebels from Yemen. This successful interception occurred outside the Earth's atmosphere thus making it the first recorded instance of space warfare during an active conflict. Israel is one of the few countries in the world capable of shooting down satellites.

The Arrow system was originally designed to intercept short and medium-range ballistic missiles with ranges above 200 km. Arrow 2 can intercept its targets above the stratosphere, to ensure that any nuclear, chemical, or biological weapons do not scatter over Israel.

What all this boils down to is the fact that we are about to witness a new domain for warfare – outer space. Till a few years back wars were primarily fought on land, air or sea, but of late it has become clear that outer space is the place where wars will be fought in future and anyone who dominates space will rule the world. There is a strong possibility that future conflicts on Earth could extend into space, or vice-versa.

The scope of warfare in space could include ground-to-space warfare, such as attacking satellites from the Earth; space-to-space warfare, such as satellites attacking satellites; and space-to-ground warfare, such as satellites attacking Earth-based targets.

The idea of space as a futuristic theatre of war has been an area of concern among experts in geopolitics, defence, and space policy. While the Outer Space Treaty and other international agreements prohibit the placement of weapons of mass destruction in space, the strategic importance of space assets has led to militarization and weaponisation of space.

The space holds immense potential as the future battlefield. It's a vast, unforgiving arena with unique challenges and opportunities, promising not just dramatic sci-fi clashes but also profound strategic shifts. Here are some key aspects to consider:

THE LANDSCAPE

- **Vastness:** Unlike terrestrial battlefields, space offers no cover, and no natural obstacles. Manoeuvring and surprise tactics become crucial.
- **Resources:** Access to asteroids, moons, and planetary resources becomes a strategic objective, fuelling space mining and economic rivalries.
- **Gravity:** Zero gravity introduces new challenges for movement, combat, and even living. Spacesuit technology and artificial gravity become vital.

THE WEAPONS

- **Directed-energy weapons:** Lasers, particle beams, and electromagnetic pulses offer long-range, high-precision attacks, but require significant power generation.
- **Kinetic projectiles:** High-velocity projectiles like railguns and mass drivers can be devastating, but require precise targeting and are vulnerable to countermeasures.
- **Cyberwarfare:** Hacking satellite systems, disrupting communication, and manipulating navigation data could cripple entire fleets without a shot fired.

THE STRATEGIES

- **Orbital supremacy:** Controlling key orbital positions provides communication and surveillance advantages, allowing for tactical strikes and early warning.
- **Space-based infrastructure:** Building space stations, resource depots, and even orbital shipyards become essential for sustained operations.
- **Alliances and treaties:** The vastness and complexity of space warfare might necessitate unprecedented levels of international cooperation to prevent escalation and ensure safe exploration.

THE CONSEQUENCES

- **Collateral damage:** Debris from space battles could pose a significant threat to satellites and even Earth itself, necessitating stricter rules of engagement.

On October 31st, 2023, an Israeli Arrow 2 anti-missile system intercepted a ballistic missile outside the Earth's atmosphere. It was the first recorded instance of space warfare during an active conflict. Israel is one of the few countries in the world capable of shooting down satellites

STRAIGHT DRIVE

Till a few years back wars were primarily fought on land, air or sea. But of late it has become clear that outer space is the place where wars will be fought in future and anyone who dominates the space will rule the world

- **Space arms race:** The development of increasingly sophisticated space weapons could lead to a dangerous arms race, jeopardizing the future of peaceful space exploration.
- **Ethical considerations:** Questions around resource ownership, the legality of space warfare, and the rights of future spacefaring civilizations will need to be addressed.
- Exploring space as the future battlefield is not just about spaceships and laser beams, but also about the complex interplay of technology, strategy, and ethical considerations. It's a future filled with both immense potential and terrifying risks, urging us to carefully navigate this new frontier with a spirit of collaboration and responsibility.

Believe it or not, space is the world's newest warfighting domain. The term warfare in space does not mean firing bullets. It could involve many things that are already taking place like satellite photography, jamming, satellite communications, hacking as well as eavesdropping and interfering with telecom traffic.

But all said and done we cannot ignore the fact that Humans are not built for space. Psychological warfare exploiting claustrophobia, isolation, and the constant threat of zero-g accidents could play a major role in breaking enemy morale. Moreover, genetically engineered soldiers or even robotic combat units might become commonplace.

As the line between space exploration and militarization blurs, moral and legal questions abound. How do we regulate warfare in an environment with little to no oversight? What happens to civilian space programs caught in the crossfire?

The potential doesn't stop at our solar system. Interstellar travel may one day become feasible, opening up whole new galaxies to potential conflict. Imagine clashes over wormhole control, disputes over resources on distant planets, or even wars against alien civilizations.

The possibilities are endless, and the implications are immense. Exploring space as a potential battlefield is not just about imagining sci-fi battles, but about understanding the challenges and consequences of militarizing this new frontier. It's a call for responsible development, international cooperation, and ethical considerations before we turn the starry night sky into a battleground.

So, buckle up. Be prepared to explore the battlefield of the future. It's going to be a wild ride.

–The writer is a seasoned media professional with over three decades of experience in print, electronic, and web media. He is presently Editor of Taazakhabar News. The views expressed are of the writer and do not necessarily reflect the views of ***Raksha Anirveda***

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INSIGHT

INDIAN ARMY 2.0: A FORCE BEYOND 2030!

As India envisions future deployments spanning from Antarctica to Central Asia and Africa to South-East Asia to protect its engines of economic power, the role of the infantry remains pivotal

By **GIRISH LINGANNA**

India is making significant strides in solidifying its position in the Asian age, particularly by bolstering its armed forces through a robust modernisation drive. Notable investments have been directed towards the Navy and the Air Force, with such key acquisitions as the INS Vikramaditya, INS Arihant, MMRCA, FFGA, Globe Master and Agni V&VI offering a glimpse into the future role of India's military.

This focused effort aims at creating a credible blue-water-capable navy and an air force with continental reach, empowering India to assert its sovereignty not only in the Indian Ocean Region but also beyond. Beyond safeguarding Sea Lanes of Communications (SLoC), the armed forces are poised to extend their role to protect India's economic interests in distant lands. In this joint endeavour, the Indian Army, particularly the infantry, will play a pivotal role, taking centre stage in addressing threats across the entire spectrum of conflicts beyond the year 2030.

THE GEOPOLITICAL LANDSCAPE

The geopolitical landscape of the 21st century is evolving towards multipolarity, with India and China emerging as key players, steering the world into the Asian age as the fastest-growing economies. As these nations transition from developing to developed status, a substantial demand is created for natural resources, serving as the catalysts for

economic prowess. In the quest for securing these resources, both countries have expanded their reach beyond territorial boundaries, venturing into the unexplored realms of the African continent, the remote expanses of Central Asia and the disputed territories of South-East Asia.

Looking ahead, India's national interests are poised to transcend traditional territorial confines, extending into non-territorial domain. The rise of China, coupled with its robust armed forces modernisation efforts against the backdrop of disputed borders with India and the challenges posed by a troubled Pakistani state, presents a formidable and ongoing challenge. The future of warfare is anticipated to be asymmetric and hybrid in nature, further complicated by the complexities of an extended neighbourhood. As India navigates these geopolitical intricacies, securing its interests becomes a multifaceted endeavour requiring strategic foresight and adaptability.

As India's economic requirements and interests experience continuous growth, a dynamic transformation in threat perceptions and power equations is inevitable. The geographical scope of its interests will extend far beyond conventional borders, reaching as far as Antarctica in the south, Africa to the east, the Central Asian Region (CAR) in the north and the South China Sea to the south-east. Safeguarding economic interests across these diverse regions, encompassing both maritime and terrestrial domains, necessitates the formation of a joint force, prominently featuring a substantial component of the army.

THE NATURE OF FUTURE WARS

Anticipating the dynamics of future battles, it can be said that they will be characterised by brevity, fluidity, intensity and rapidity. The scale of forces involved may vary—ranging from large deployments to specialized operations executed by a select group of highly skilled soldiers. Advanced technologies will play a pivotal role and operational plans will seamlessly incorporate diverse terrains and weather conditions.

The conventional linear battlefield will give way to combat situations marked by a 360-degree threat environment, requiring forces to be agile and adaptable. Future battles are poised to be network-centric, leveraging cutting-edge technologies, including new high-tech weaponry; nuclear, biological and chemical (NBC) arsenal; and the involvement of non-state actors. The nature of warfare is expected to be hybrid, spanning the full spectrum of conflict and will prioritize the effects achieved rather than the sheer massing of forces.

CAPABILITY TO BE THREATENED?

The transformation of the Indian Army from a threat-centric force to a capability-based one, with a strategic vision extending beyond 2030, must be accelerated. In this evolution, the infantry stands as a focal point, necessitating its modernisation to align with contemporary demands. The role of the infantry will encompass a wide spectrum of responsibilities—ranging from traditional border management and counter-insurgency operations to handling internal security duties, disaster management and relief operations and participating in stabilisation efforts through bilateral and regional cooperation in areas of India's interest.

To meet these diverse challenges, the future structure of infantry formations and units must be characterized by responsiveness and effectiveness. Infantry divisions, brigades and battalions of the future need to adopt flexible organisational frameworks that facilitate grouping and regrouping according to operational requirements. The envisioned force must embody a versatile combination of capabilities, equipped with lethal, agile, adaptable and responsive technologies

The geopolitical landscape of the 21st century is evolving towards multi-polarity, with India and China emerging as key players, steering the world into the Asian age as the fastest-growing economies

and weaponry. This adaptability will be crucial in addressing the evolving nature of threats and missions anticipated in the years beyond 2030.

ROLE OF INFANTRY IN CONFLICT

In a multipolar global scenario, military strategies are increasingly influenced by a nation's economic interests. Consequently, conflicts are anticipated to be more prevalent in the middle and lower segments of the spectrum, underscoring the crucial role of infantry in safeguarding a nation's interests in the future. This transformation envisions specialised infantry units equipped with well-developed core competencies capable of addressing diverse segments of the threat spectrum.

This shift signifies a fundamental change from a threat-centric approach to a capability-based paradigm within the armed forces. The emphasis on versatile and adaptable infantry units reflects the strategic imperative of aligning military capabilities with the evolving geopolitical landscape and the multifaceted nature of contemporary security challenges.

STRUCTURE AND FUTURE SOLDIERS

The current paradigm of Infantry divisions in the Indian Army, characterised by fixed formations and units, is poised to undergo a significant transformation. The evolving nature of future battlefields necessitates a shift towards modular structures, turning Infantry divisions into agile and adaptable plug-and-play formations. In this new approach, divisions will be configured for specific missions, assigned a tailored combination of brigades and battalions with the requisite capabilities.

In the envisioned futuristic infantry force structure, tailored to confront 360-degree threats across the full spectrum of conflict, the infantry soldier is slated for a revolutionary transformation in both equipment and training. The future infantry soldier will embody a system within systems, characterised by effectiveness, efficiency and task-oriented capabilities. A key focus will be on accomplishing diverse tasks with economy of effort, demanding a high level of adaptability and survivability across varied terrains and climates.

This transformed infantry soldier, functioning as a system, will be designed to deliver lethality with precision and effectiveness. His capacity to maintain situational awareness and self-synchronisation will empower him to engage in coordinated and integrated battles. Within a networked environment, this heightened ability of a soldier will enable commanders not only to multitask with sub-units and units but also to enhance the effectiveness and decisiveness of individual combatants. The emphasis on this comprehensive approach aims to ensure that future infantry soldiers are well-equipped, highly skilled and seamlessly integrated into modern warfare scenarios.

In the future, the infantry will be strategically configured to execute operations seamlessly across the entire spectrum of conflict at short notice. Modernisation efforts will revolve round

five cardinal principles: Lethality, Survivability, Mobility, Situation Awareness and Sustainability. These key factors will form the foundation for the optimal transformation of infantry, ensuring they are equipped to effectively navigate and succeed in a wide range of operational scenarios.

WHEN IT COMES TO LETHALITY

'Future Soldier as System' initiatives are currently underway in several countries, reflecting a global trend in modernizing infantry capabilities. Examples include the Land Warrior Integrated Soldier System in the USA; the IDZ in Germany; FELIN in France; FIST in the UK; and the F-InSAS programme in India. These projects aim to develop fully networked, all-terrain, all-weather personal equipment, coupled with enhanced firepower and mobility, tailored for the digitized battlefields of the future.

The future infantry is envisioned to be equipped with mission-oriented gear seamlessly integrated into the overall Command, Control, Communication, Computers, Information and Intelligence (C4I2) environment. This holistic integration extends to systems, sub-units and units, enhancing the soldier's effectiveness in a digitized and interconnected battlefield. Such advancements are poised to significantly elevate the lethality of the infantry, transforming them into self-contained, highly capable fighting units.

The envisioned virtues of modern infantry weapons systems prioritise such attributes as light weight, modularity, lower mean time between repairs and failures (MTBR & MTBF), long range with high accuracy and desired lethality. Moreover, their ability to operate effectively in a network-centric and electronic warfare environment across the entire spectrum of conflict is deemed crucial as a decisive factor in battles.

Several futuristic trends in infantry weapons systems align with these desired attributes. Examples include SCAR-Light multiple-caliber assault rifles; the Objective Individual Combat Weapon (OICW) XM-25 featuring microchip-embedded explosive rounds for precise detonation; Metal Storm's 36-barrelled stacked projectile machine gun; Corner Shot sideways-firing grenade launchers; disposable magazine-fed mortars with smart projectiles; Next-generation Light Anti-tank Weapon (NLAW) offering lightweight shoulder-fired anti-tank capabilities with Predicted Line of Sight (PLoS) and Over the Top Attack (OTA) and sniper rifles with extended ranges and self-correcting systems based on advanced sensors. These innovations underscore a concerted effort to equip infantry with cutting-edge technology, enhancing their firepower, adaptability and effectiveness in diverse combat scenarios.

SO, WHAT'S THE BOTTOMLINE?

In the evolving landscape of modern warfare, robust communication and situational awareness are paramount for infantry soldiers. Effective communication from a soldier on patrol to higher commanders is facilitated by a network system that ensures connectivity even in challenging terrain where traditional communication links may be disrupted. Voice and data transmission can be relayed directly or through drone relay links, fostering seamless communication from higher headquarters to the frontline and vice versa.

To enhance situational awareness, hand-held UAVs for over-the-hill surveillance will be complemented by ground-based, all-weather surveillance devices, sensors and weather monitoring equipment. These additions to the infantry inventory will significantly contribute to overall understanding of the operational environment.

However, these advancements also come with an increased demand for electric power. Estimates suggest that the future power requirements of an infantry soldier may rise to over 10 times the current levels. To meet this escalating demand, fuel cells and fuel cell chargers are expected to play a crucial role, ensuring a sustainable and reliable power source for infantry soldiers in the days ahead.

Improving interoperability both within the country and between the armed forces in the region is crucial. This necessitates increased military-to-military interactions at strategic, operational and tactical levels with friendly forces in the region. It is essential to recognise that, in the current and potential future global multipolar order, the dynamics between military and economic power have shifted.

In the past, military power held paramount importance, while economic power was considered a luxury. However, today, economic power takes precedence and military power is essential to safeguard and assert that economic influence. The infantry's prominence in these endeavours reflects the changing nature of global power dynamics and the strategic imperative of safeguarding economic interests in diverse and dynamic regions.

–The writer is a Defence and Aerospace Analyst. The views expressed are of the writer and do not necessarily reflect the views of ***Raksha Anirveda***

Improving inter-operability both within the country and between the armed forces in the region is crucial. This necessitates increased military-to-military interactions at strategic, operational and tactical levels with friendly forces in the region

SPECIAL FEATURE

FORGING DEEPER CONNECTIONS

French President Macron's acceptance to be the chief guest at India's 75th Republic Day signifies the enduring depth of the strategic partnership between the two nations. Their collaboration spans diverse realms, including defence, trade, technology transfer, nuclear cooperation, and shared values, showcasing a skilful navigation through a complex geopolitical landscape

By **RAVI SRIVASTAVA**

On December 12, 2023, the US confirmed that President Joe Biden would not be travelling to New Delhi as the invited chief guest for India's 75th Republic Day. An invitation for the chief guest on India's Republic Day is no small matter; it is reserved only for heads of state or heads of government of a country with which India maintains solid friendly relations. Due to its importance, everything is bipartisan in nature and reflects the emotional connection of the country to its national event.

The significance also necessitates advanced and careful preparations for months ahead to ensure it rolls out with the expected fervour while adhering strictly to all protocols. The Chief Guest's availability is double-checked through diplomatic communications before extending the invitation. It was these deliberate behind-the-scenes preparations that resulted in initial disbelief and some annoyance in New Delhi.

This development was also linked by some with ongoing difficulties with the US, following their flagging of safety concerns for a US citizen. These may be nothing more than wild speculation and completely dismissive in character. But is there a sudden change in US-India relations that warranted President Joe Biden to recuse himself from the Delhi visit, even putting doubts over the proposed QUAD summit? Many believed it was only some charged and motivated front-page reports that appeared to be the cause behind it.

The French worldview has been in complete sync with India's own aspirations. It supports a multilateral global order, connects with the Global South, backs India's place in the reformed UN Security Council, and is not hesitant to share high-end sensitive technologies

BOOMING RELATIONS

India and France not only share historically friendly relations, but they have consistently graduated to strategic and then vital defence partners. The French worldview has been in complete sync with India's own aspirations. It supports a multilateral global order, connects with the Global South, backs India's place in the reformed UN Security Council, and is not hesitant to share high-end sensitive technologies. It also shares a deep understanding of India's challenges as a developing nation, on climate issues, and India's dynamic neighbourhood security environment.

India has responded in equal measure, allowing French companies to engage in joint manufacturing in its sensitive defence sector, taking steps to enhance trade and commerce directly benefiting French domestic industries, and coordinating views on global issues at multi-nation forums. These concerted initiatives have seen a qualitative jump in the Indo-French bilateral trade, which is worth $20 billion and has now made France India's 11th largest trading partner. To give it a further

SPECIAL FEATURE

To France's credit, it has maintained maturity while handling multiple and often conflicting viewpoints among its friends and partners. This indicates a vintage accommodative approach in diplomacy, which is largely found missing in high-headed dealings nowadays

boost, the Indian PM visited France in July last year to commemorate 25 long years of a strategic partnership. The Bastille Day Parade in France saw glorious participation by an Indian Tri-service contingent."

ARDUOUS JOURNEY

France has transformed itself over the years from being just one of the members of the EU into a significant voice within it. It has been an arduous journey, especially as British participation in the EU started to wane, leading to its exit from the union in 2020. While France desired the sustenance of the larger EU arrangement, it was also clear that it must represent the 'French Vision' on global matters rather than remaining muted, as the EU had been seen doing for some time.

France's consistency in holding onto its independent opinion has created more openings and possibilities for solutions to some grave threats faced by the world today. It was among the nations that were not very enthusiastic about the idea of Ukraine joining NATO or NATO's outreach to Japan. It did not support extreme measures against Russia or the Western plan to exclude Russia from the G8. France kept communications with Beijing open, exemplified by President Macron's visit to China last April to 'understand' how it could contribute to peace in Ukraine, even when the EU and the US were critical of China's support for Russia.

France appears to choose its own foreign policy goals independently, sometimes incurring hostile costs. For instance, in June 2022, Australia removed France from its $66 billion submarine deal, bringing in the US and UK as replacements for providing eight nuclear-powered submarines. France expressed 'clear disappointment' and was criticized for not 'doing enough' to support Ukraine's membership in NATO.

COMPASSIONATE RECOGNITION

To France's credit, it has maintained maturity while handling multiple and often conflicting viewpoints among its friends and partners. This indicates a vintage accommodative approach in diplomacy, which is largely found missing in high-headed dealings nowadays. France and India have a long 'to-do' list, but like a mega structure needing a strong foundation, bilateral relations need strong mutual trust.

The Indo-French partnership has a unique dimension in that it doesn't conflict with their relationships with any third country, enabling unbounded growth prospects in trade and commerce, joint R&D in defence and production, transfer of niche technologies, nuclear cooperation, movement of skilled manpower, preferential access to Indian markets, and eliminating double taxation. Each aspect has massive potential for growth, with India moving towards a trillion-dollar economy, positioning itself as the world's third-largest economy and the biggest market, offering a blue sky for this booming relationship.

Geopolitics may cause untimely and unwarranted fissures in mutual relationships, a common occurrence in global affairs. However, the larger picture must always be acknowledged. Friends and close partners who have walked together through difficult miles must remain sensitive to each other's concerns and difficulties. For democracies, elected governments prioritize ensuring national integrity and bringing prosperity to their people transparently. They rightfully expect their long-term friends and close partners to support them while converging on the long-term perspective. Continuing dialogue for better understanding and accommodating difficult choices remains the hallmark of lasting relations.

As with France, India will continue to explore greater possibilities with its friends while leaving its doors open for other partners like the US and Canada to demonstratively walk 'a few steps' for it!

–The writer has varied experience in security paradigm and is a keen follower of international geopolitics. His work has been routinely featured in national publications and newspapers. His articles can be viewed on the popular blog site newsanalytics.co.in on geo-strategic affairs. The views expressed are of the writer and do not necessarily reflect the views of ***Raksha Anirveda***


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SPECIAL FEATURE

WINGS OF ALLIANCE

BOOSTING INDIA-FRANCE STRATEGIC PARTNERSHIP

President Macron's presence at India's 75th Republic Day celebration serves not only as a diplomatic gesture but as a testament to the enduring and multifaceted partnership between India and France, rooted in shared values and strategic imperatives. Beyond defence deals, the visit holds potential for ground-breaking collaborations, focusing on joint aerospace ventures characterised by co-design, co-development, and manufacturing capabilities for global markets

By **AIR MARSHAL M MATHESWARAN**

As India is all set to celebrate its 75th Republic Day, a few days from now, French President Emmanuel Macron will grace the occasion as the chief guest. It will be the sixth time a French President will be the chief guest on India's Republic Day, underscoring the importance of France as India's significant strategic partner. This is also the 25th anniversary of the India-France strategic partnership. Some see the invitation to Macron as reciprocity for the honour given to the Indian prime minister as the chief guest on France's Bastille Day in July last, even though the invitation to the French President was extended after the unsuccessful attempt to bring the US President Joe Biden. Notwithstanding all this, it is well-recognised that India and France share a robust strategic partnership, underscored by the commonality in the two countries' culture of pursuing strategic autonomy and sovereign decision-making in global affairs. Dominated by the strong cooperation in defence, nuclear, and space sectors, there is considerable expectation of major defence deals during this visit.

The primary Indian expectation revolves around acquiring more Rafale fighter jets for the Indian Air Force and the Indian Navy. The Defence Acquisition Council had cleared last year the acquisition of 26 Rafale-M jets for the Indian Navy along with the construction of three more Scorpene submarines before the state visit of Prime Minister Narendra Modi to France in July 2023. While the media announced the deals as finalised, the joint statement left out the two, indicating much work and negotiations were still needed.

Subsequently, the Indian Navy announced the choice of Rafale M over the F-18 Super Hornet for the two aircraft carriers, INS Vikrant and INS Vikramaditya.

Meanwhile, the IAF's long-pending case for the acquisition of 114 MRFA (a renaming of the earlier cancelled MMRCA programme – essentially semantics) has been fast-tracked for the government's decision. Given the fact that the IAF is already operating the 36 Rafale jets, the French are likely to push India hard to decide in favour of the Rafale for both requirements for reasons of commonality, ease of maintenance, and cost-effectiveness, as performance is already a well-settled factor. Other cases likely on the table are the contract for three additional Scorpene submarines to be produced by the Mazagon Dockyards and the French proposal for the co-development of the aero-engine for the AMCA.

There is considerable convergence in the worldviews of both France and India. The national leadership of France, acutely aware of the emerging American-dominated post-1945 world, worked hard to ensure France's strategic autonomy primarily through economic and technological independence and a solid export-oriented arms industry. France has been the only Western country that has displayed a mature understanding of India's

India and France share a robust strategic partnership, underscored by the commonality in the two countries' culture of pursuing strategic autonomy and sovereign decision-making in global affairs

SPECIAL FEATURE

fierce guarding of its strategic autonomy and has supported India's position on varied issues ranging from the nuclear tests in 1998 to the ongoing Russia-Ukraine war.

These factors have enabled a robust growth of strategic, defence, and industrial collaborations and partnerships. France is a significant source of FDI in India, with over 1,000 French establishments already present in the country. More than any other country, France understands that mastery over critical technologies is the crux of its strategic autonomy. Similarly, India's strategy for technology sovereignty is rooted in its national interests and eliminating critical dependencies and vulnerabilities.

Regarding the transfer of technology and access to critical technologies, India knows that France is as difficult a country as the USA to part with technology. Both countries will sell their weapon systems and products, including high-quality product support, but with little access to design knowledge. Joint ventures are primarily licensed production almost entirely for the Indian defence market and with minimal access to the global supply chain for Indian manufactured products and accessories.

Successful co-development ventures are primarily in the area of IT-enabled engineering solutions. Despite this, India-France collaborations rest on a solid foundation of trust and reliability. A primary reason for this is France's reliable track record of honouring contracts religiously and not letting any geopolitical issues interfere. That cannot be said of the USA, even though it has become the biggest defence equipment supplier in the last 16 years, scaling USD 22 billion. There is always an element of uncertainty in Indian minds that the USA can pull the plug anytime for its geopolitical interests.

The critical issue, however, is that India, unlike China, has been unable to leverage its substantial armament imports over the years, including from France. Notwithstanding this, India is now at a critical stage in its aerospace and defence capabilities. With the LCA-Tejas Mk1/1A well-established in series production with an order book of nearly 200 aircraft for the IAF and more numbers in possible exports, it is time to follow a robust and accelerated development strategy. France will undoubtedly push for additional Rafale aircraft orders. India must take a step back to rethink its aircraft procurements and instead focus on the rapid development and manufacture of the larger platforms, Tejas Mk 2/TEDBF and the AMCA.

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The IAF has waited for more than two decades for its MMRCA. If the original 126 MMRCA procurement, where Rafale was the short-listed platform, had fructified in time (around 2012-14), India, by now, would have gained immensely through manufacture, value addition, and the growth of an Indian aerospace ecosystem. Not only would the IAF have had a more significant number of state-of-the-art aircraft in its force structure, but also more importantly, the Indian industry would have been the most significant technology beneficiary.

Unfortunately, this was not to be. Off-the-shelf procurements do not help indigenous industry development. It only addresses urgent combat capability requirements of the military. The earlier procurement of 36 Rafale aircraft falls in this category, and so will the proposed procurement

of the 26 Rafale Ms for the Indian Navy. IAF's requirement of 114 MRFA will be a process that will take many years despite all efforts to make the notorious procurement process more efficient. While the 26 naval version of Rafales will likely cost around USD 6 billion, the MRFA may exceed USD 20 billion, a considerable cost to the exchequer.

Maybe leveraging the India-France strategic partnership better through collaborations and co-development is wiser. Tejas Mk 2 for the IAF and the Twin-Engine Deck-Based Fighter (TEDBF) for the Indian Navy are planned to be in the Rafale category. Clearly, these two platforms, building on the Tejas Mk 1/1A experience, will form the backbone of the IAF and the Indian Navy's fighter arms in the following decades.

A combined production run of at least 500 aircraft is a distinct possibility. This experience will also help accelerate the next-generation platform, AMCA. Having lost many years because of the inefficient procurement process, it is now prudent to focus on the accelerated development of these platforms. As a partner in these projects, France could be of considerable help in achieving this objective. Unlike in the past, France must become a stakeholder in the success of these projects.

Similarly, achieving full capability in designing, developing, and manufacturing aero-engines is of utmost importance and a critical strategic necessity for India. Aeroengine capability is a complex challenge and remains the ultimate objective for any nation aspiring to be a great power. China, flying its indigenous engines on some platforms, still finds them sub-optimal despite more than 50 years of intense struggle. While creditable work has been done in the Kaveri engine project, it was incomplete and had to be shut down after three decades of work. All is not lost, as an enormous database is now available for further research and development.

While India has signed a contract with American General Electric for the licensed manufacture of 90 GE 414 engines, France's Safran has offered to partner in the co-development of the next-generation engine. This is a significant offer and probably comes from the wisdom of a failed attempt at a JV with GTRE earlier. In 2007, Snecma offered a JV with India's GTRE to address the gaps in Kaveri engine development and ensure the completion of the Kaveri project. Though actually, it was a hidden offer where the Kaveri core engine was to be replaced with the Snecma engine core, thus making it virtually a licensed production project. Government of India saw through it, and the offer was rejected. Safran's current offer is an *ab initio* engine project to be developed jointly for Indian and French requirements. Safran is already in a JV with HAL to develop a helicopter engine for the IMRH project.

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President Macron's visit could be turned into a historic strategic partnership milestone if France can become a strategic investor and stakeholder in the success of India's aerospace capability. France's assistance could accelerate the development of Tejas Mk2 and TEDBF in a short timeframe of five to six years and enter series production. The AMCA, coming later, could cap the two countries' efforts. Such an approach will effectively ensure India will not need to import any more fighter aircraft in the future. Naturally, business houses will want a straightforward procurement order without the complexity of strategic partnership. It's time India moves away from these routine procurement patterns, masquerading as signs of strategic partnership. India's national interests will be better served with a radically different approach to engaging our closest partners in a win-win situation of building India's joint aerospace ventures in co-design, co-development, and manufacturing for the world.

–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.

ANALYSIS

IN THE CROSSHAIRS

The prolonged Israel-Gaza conflict is reshaping geopolitics and global economics. The profound changes in the world order prompt a closer examination of India's role within this evolving scenario

By **PRANAY K. SHOME**

Niccolo Machiavelli, the Italian diplomat and political philosopher, adopted a highly pessimistic view of human nature. He characterised people as egoistic, materialistic, and narcissistic, believing that they would "readily forgive the murder of their fathers, but never the theft of their property." War, according to him, was an inherent part of human nature. Similarly, philosophers like Georg Wilhelm Frederich Hegel considered war an essential component of statecraft, promoting the "ethical health of people." However, the contemporary era seems to deviate from such perspectives, with the exception of the tumultuous Middle East.

Hamas, the Sunni terrorist organisation, conducted unprecedented terror attacks in Southern Israel on October 7. The scale of the attacks included over 7,000 rocket strikes and the involvement of 1,500 militants descending from paragliders, resulting in the deaths of 1,400 innocent civilians and the abduction of more than 200 hostages. In response, Israel launched a ferocious assault on Gaza, marked by a relentless air campaign. The death toll on the Palestinian side has surpassed 17,000, and although a ceasefire was agreed upon, it has since collapsed.

GLOBAL POLITICS AND GREAT POWER COMPETITION

Undoubtedly, the Israel-Gaza war stands as one of the most tragic events of the 21st century so far, with significant material and human casualties. However, global politics is not solely concerned with human rights but also with great power competition. In light of this, understanding the impact of the war on the world order and how it will shape India's foreign policy and national interests becomes imperative.

The Middle East, a crucial geopolitical region, is now back on the edge due to the Israel-Gaza conflict. The war has and will continue to keep the Middle East in a precarious state, altering its geopolitical landscape even after its conclusion. The promising Abraham Accords of 2020, establishing formal diplomatic ties between Israel and four Arab states (UAE, Bahrain, Sudan, and Morocco), are now overshadowed by the conflict. Even Saudi Arabia, the de-facto leader of the Islamic world, was contemplating a peace deal with Israel before the outbreak of hostilities. However, the current conflict has dashed hopes for such diplomatic breakthroughs, particularly regarding Jerusalem, a complex and conflict-ridden focal point in the region.

The West, despite facing criticism for the rising civilian toll, has rallied behind Israel in the conflict. The US exercised its veto power, rejecting a resolution calling for an immediate ceasefire in Gaza. This move solidifies Western support for Israel and exacerbates the division between the West and the Islamic world, posing challenges for regional peace.

INDIA'S ROLE AND THE ONGOING CONFLICT

As the Israel-Gaza conflict unfolds, its far-reaching consequences demand a nuanced understanding of its impact on the world order. India, in navigating its foreign policy and safeguarding its national interests, finds itself intricately connected to this seemingly intractable Middle Eastern conflict.

The ongoing conflict has naturally incited strong reactions in the Islamic world, where sentiments against Israel run high. This is evident in the sizable anti-Israel protests staged in major Middle Western cities. Of greater concern is the increasingly hostile and anti-Semitic tone permeating these rallies, especially among social media users.

A particularly alarming trend is the emergence of calls on social media by certain elements worldwide for the genocide of the Jewish people, a deeply troubling development.

CLASH OF CIVILISATIONS AND TECHNOLOGICAL COMPETITION

That said, it is apparent that ongoing negotiations to resolve the conflict have given rise to serious disagreements among nation-states, culminating in a scenario reminiscent of a clash of civilisations. Simultaneously, the technological great power competition is intensifying, with Israel employing cyberspace extensively to counteract Hamas' cyber warfare capabilities. Another dimension is the escalating integration of artificial intelligence into countries' hard power capabilities.

Israel's adept use of cyberspace to counteract cyber threats from groups like Hamas highlights the evolving nature of modern warfare. The integration of artificial intelligence into military hardware, such as drones and autonomous weapons, underscores the changing dynamics of military strategies. The recent AI safety summit in Bletchley Park reflects

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ANALYSIS

Primarily, India has much to lose if Israel fails to normalise ties with Gulf kingdoms and Islamic nations. The Middle East is crucial for India in terms of investment, energy, and counter-terrorism efforts. A deterioration in relationships with regional allies could leave India in a precarious position, requiring delicate diplomatic manoeuvres in an increasingly turbulent region

global awareness of the need to address the ethical and safety implications of AI in warfare.

IMPLICATIONS FOR INDIA

India and China, recognising the strategic importance of technological advancements, are investing significantly in AI research and development. This not only enhances their military capabilities but also positions them as key players in the evolving landscape of global power dynamics.

As the world's most populous country and the fifth-largest economy, India has become a formidable force in global politics. In light of the escalating conflict, the pertinent question arises: where does India stand?

Primarily, India has much to lose if Israel fails to normalise ties with Gulf kingdoms and Islamic nations. The Middle East is crucial for India in terms of investment, energy, and counterterrorism efforts. A deterioration in relationships with regional allies could leave India in a precarious position, requiring delicate diplomatic manoeuvres in an increasingly turbulent region.

Furthermore, the conflict emphasises the global menace of terrorism, prompting a renewed call for India to take the lead in mobilising international consensus against terrorism. Although India initiated a convention on terrorism definitions in 1996, progress has been hindered by a lack of consensus. It is once again time for India to spearhead efforts to develop a comprehensive definition of terrorism, potentially strengthening its bid for a permanent seat on the United Nations Security Council.

The repercussions of the ongoing conflict are substantial for India, particularly in its relationships with key players in the Middle East. The delicate balance required in maintaining diplomatic ties becomes increasingly challenging in the face of escalating tensions.

Moreover, the conflict serves as a stark reminder of the persistent threat of terrorism. India, having taken the initiative in 1996 to address terrorism through a comprehensive convention, now faces an opportune moment to revive efforts towards a consensus on defining terrorism globally. Such a move not only aligns with India's commitment to combating terrorism but also positions the country as a leader in fostering international cooperation on this critical issue.

The multifaceted implications of the ongoing conflict demand a nuanced and proactive approach from India. Navigating the intricate web of geopolitics, technology, and security requires a deft touch in diplomacy and a commitment to addressing global challenges. As India stands at the crossroads of this complex landscape, its actions and decisions will not only shape its own destiny but also contribute to the broader trajectory of global affairs.

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

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OPINION

NAVIGATING THE QUAGMIRE

In the Israel-Hamas conflict, political challenges and regional shifts unfold. Israel's settlement policies hinder a free Palestinian state, empowering groups like Hamas. Israel eyes Gaza control, risking prolonged internal conflict. Iran's influence grows, employing strategic disruptions. Hamas' subterranean warfare adds an asymmetric threat, calling for enhanced surveillance for potential border challenges across nations

By **G. MOHAN KUMAR**

The Israel-Hamas conflict, sparked by the brutal assault on hundreds of innocent Israeli citizens, is entering a protracted phase. Despite initial global sympathy, Israel's retaliatory strikes, aimed at dismantling Hamas and its subterranean war machine, have led to a significant erosion of its moral standing.

Prime Minister Netanyahu, caught in his own rhetoric, faces a delicate political situation. Urged by the USA to minimise collateral damage, he must balance public opinion with the potential risks of escalating the conflict. The alternative—de-escalation—could jeopardise his political future, given his current low popularity.

Opting for a strategy of escalation, Netanyahu's recent drone attack targeting Saleh al-Arouri, Hamas' deputy chief in Beirut, introduces new complexities. The move invited potential retaliatory strikes from Hezbollah, opening a northern front and widening the scope of the conflict.

STRATEGIC SHIFTS BY HAMAS

Hamas, initially condemned for terrorist tactics, strategically shifts its approach. The group not only targeted innocent Israeli citizens but also used Gazans as human shields to discredit Israel globally. This calculated strategy involves mobilising anti-Semitic, Islamic, and Woke sentiments worldwide.

RETROSPECTIVE ANALYSIS OF HAMAS TACTICS

Retrospectively, it appears that Hamas and its Middle East sympathisers, such as Iran and Qatar, may have war-gamed these manoeuvres. Substantial financial aid intended for Gaza's development was instead used to build Hamas' subterranean war machine, catching Israel off guard.

Hamas adeptly transforms its narrative, portraying Jihad as a benevolent, liberating force. This narrative shift garners steadfast support from a new generation of sympathisers worldwide, posing a challenge in countering the group's reshaped image.

The conflict exposes the ineptitude of the Palestine Authority, contributing to an increase in Hamas' popularity among Palestinians. The complex power dynamics within Palestinian territories add another layer of challenge to achieving a lasting resolution.

Hamas, initially condemned for terrorist tactics, strategically shifts its approach. The group not only targeted innocent Israeli citizens but also used Gazans as human shields to discredit Israel globally. This calculated strategy involves mobilising anti-Semitic, Islamic, and Woke sentiments worldwide

Israel's current predicament is a result of a focused fifteen-year effort to erode the concept of a free Palestine state, primarily through the promotion of extensive Jewish settlements on the West Bank. This uncompromising stance, denying Palestinians an independent homeland, has inadvertently provided a platform for groups like Hamas to gain acceptability and co-opt the Palestinian cause.

Former US President Trump's explicit recognition of Jerusalem as Israel's capital has added fuel to the fire. This decision has exacerbated tensions and weakened international support for Israel's right-wing stance, putting increased pressure on President Biden to pursue a lasting two-state solution.

INDIA'S POTENTIAL DIPLOMATIC ROLE

India, with its balanced approach, stands as a potential diplomatic player in resolving the conflict. Its intervention could play a crucial role in bringing about peace in the Middle East and finding a sustainable solution to what is considered the longest conflict post-World War II.

ISRAELI GOVERNMENT'S STRATEGY

Signs indicate that Israel intends to maintain control over Gaza through the Israel Defence Forces (IDF) with the aim of eradicating Hamas. The potential escape of key Hamas operatives to other countries may pose the risk of regrouping and extending influence over the West Bank.

The failure to achieve a peaceful resolution may result in prolonged internecine conflict among Palestinian factions, potentially escalating into a broader, all-encompassing war. The West Bank and Gaza could transform into hotbeds of Islamic fundamentalism, echoing the emergence of an Islamic State-like movement.

IRAN'S GROWING INFLUENCE

Iran's influence in the Middle East is evidently expanding, seen through its support for Hezbollah in Southern Lebanon, backing of Hamas, and networking with groups in Yemen and Iraq. This development has the potential to draw Israel into a protracted and broader regional conflict.

CHALLENGES TO REGIONAL STABILITY

Iran's disruptive actions, such as impacting shipping operations through the Suez Canal and instigating piracy off the Somalia coast, point towards a strategic plan to leverage its position in the region, possibly with support from China and Russia.

Iran's efforts to prevent Saudi Arabia from establishing diplomatic ties with Israel, coupled with potential nuclear ambitions, are raising concerns. Reports suggesting Iran possesses enough fissile material for a nuclear device, along with recent tests of a hypersonic missile, Fatta II, underscore its motives.

Hamas' subterranean war machine, featuring well-equipped tunnels spanning nearly 500 km, has become a significant factor in asymmetric warfare. India, given its extensive border with Pakistan, must consider this factor in its anti-terrorist strategy, especially regarding the potential existence of subterranean infrastructure on borders

NEED FOR ENHANCED SURVEILLANCE

Hamas' subterranean war machine, featuring well-equipped tunnels spanning nearly 500 km, has become a significant factor in asymmetric warfare. India, given its extensive border with Pakistan, must consider this factor in its anti-terrorist strategy, especially regarding the potential existence of subterranean infrastructure on borders.

In light of the subterranean threat, armed forces in border areas, such as Jammu and Kashmir and Punjab, must bolster capabilities. Acquiring powerful earth-penetrating radar systems for extensive surveillance across the India-Pakistan border is crucial for detecting and countering potential threats.

–The writer is a former Defence Secretary. The views expressed are of the writer and do not necessarily reflect the views of ***Raksha Anirveda***

GUEST COLUMN

AMIT COWSHISH

DEFENCE BUDGET 2024 LIKELY TO STAY THE COURSE

The interim budget before the upcoming Lok Sabha elections is likely to reflect the imperatives of electoral calculations, though without any major impact on the momentum built up over the past few years of increasing defence outlays. Thus, 13-14 per cent of the total expenditure of the Central government is expected to be earmarked for defence expenditure

In a few days from now, Finance Minister Nirmala Sitharaman will present an interim budget for the coming fiscal year 2024-25. Confident that the ruling Bharatiya Janata Party will return to power after the general elections, due in early spring, she is likely to stay the course and present a growth-oriented budget, avoiding overambitious promises that may have to be toned down when the regular budget is presented after the new government is constituted.

This does not rule out the possibility of some concessions being made to the voters to counter the lure of freebies, which every political party is expected to promise at the hustings, but the revenue-consuming government departments do not fit into this scheme of things. Accounting for about 13-14 per cent of the total Central Government Expenditure (CGE), the Ministry of Defence (MoD) falls in this category.

Some defence analysts would disagree with this characterisation. Defence expenditure, they would argue, spurs economic growth, especially if it is wisely channelised into the manufacturing and services sector. While there is some truth in this argument, defence expenditure cannot be the primary driver of economic growth; other sectors are equally, if not more, critical drivers of growth. Consequently, government expenditure has to be balanced between competing demands from growth-generating sectors, revenue-consuming departments, and social welfare schemes. This is unlikely to change in the coming years.

What does it mean for the armed forces and other departments such as the Defence Research and Development Organisation (DRDO), Indian Coast Guard (ICG), and Border Roads Organisation (BRO), which are funded by one or the other of MoD's four Demands for Grant: MoD (Civil), Defence Services (Revenue), Capital Outlay on Defence Services, and Defence Pensions?

The most enduring criticism of the defence budget has been the inadequacy of the outlay set aside for the MoD as a whole, and for the armed forces, in particular. The gap between the requirement of funds projected by the armed forces in the run-up to formulation of the union budget, and the actual budgetary allocation went up progressively from Rs 23,014 crore in 2010-11 to Rs 1,01,678 crore in 2022-23, where after it fell sharply to Rs 33,214 crore in 2023-24.

The narrowing of the gap between the projection and allocation was on account of two factors. One, in an unprecedented move, the services toned down their projection, and two, there was a reasonable hike in the budgetary allocation. In the year 2022-23, the services demanded Rs 4,59,223 crore for revenue and capital expenditure. Instead of the requirement going up in 2023-24, it came down to Rs 4,38,631 crore.

The toning down of the requirement was matched by a year-on-year increase of 13.41 per cent in the budgetary allocation to the armed forces, which is arguably as good as it can get, considering the multifarious demands on the resources, especially on account of growth-oriented capex and welfare schemes which originated during the Covid-19 pandemic.

This trend is likely to continue as the services have apparently realised the futility of making unrealistic demands with full knowledge that the Ministry of Finance (MoF) will not be able to meet them. Considering the buoyancy in revenue

Defence expenditure cannot be the primary driver of economic growth; other sectors are equally critical drivers of growth. So, government expenditure has to be balanced between competing demands from growth-generating sectors, revenue-consuming departments, and social welfare schemes. This is unlikely to change in the coming years

collection, low current account deficit, the likelihood of the fiscal deficit targets for the year being met, a promising outlook on economic growth in the coming fiscal, and a variety of other factors, the growth in budgetary allocation is also likely to be comparable with the increase in budgetary allocation for the current fiscal.

This analysis could go awry if the subdued demand for funds in 2022-23 was on account of the payment for imports from Russia being held up. According to some reports, payment worth $3-4 billion has accumulated in the 'vostro' account -the mutually agreed protocol to route payments in the Indian currency- and Russia growing weary of continuing with this arrangement for supplying platforms, equipment, spares, and services to India.

The equipment awaiting delivery from Russia, or finalisation of the contract, includes three of five Almaz-Antey S-400 Triumf self-propelled surface-to-air (SAM) missile systems, four Admiral Grigorovich Project 1135.6M frigates, of which two were to be built by Goa Shipyard Limited with transfer of technology from Russia, and 80,000-odd Kalashnikov AK-203 7.62x39 mm assault rifles, a majority of which were to be licence build at Korwa in Uttar Pradesh. The possible leasing of another Project 971 'Akula' (Shchuka-B)-class nuclear-powered submarine (SSN) was also under consideration, and is now apparently on hold.

The requirement of funds for capital expenditure could also go up if the MoD expects other big projects such as the acquisition of the twin-engine Rafale aircraft for the Indian Navy, General Atomic MQ9 Reaper hunter-killer UAVs, and General Electric's GE-414F engines for the Light Combat Aircraft, as also construction of submarines under Indian Navy's Project 75(I), to go through during 2024-25, necessitating payment of advance money to the suppliers. As of now, the possibility of all these projects fructifying simultaneously in the coming fiscal seems remote, though.

Apart from the obligatory expenditure on salaries, ration, and clothing, the revenue budget also caters for operational expenditure on upkeep of the in-service equipment, procurement of ammunition and other ordnance stores, training, transportation of troops and material, and maintenance of the military infrastructure

Pragmatism in projecting the demand for capital expenditure also seems to have helped in more funds being made available by the MoF for revenue expenditure of the armed forces. The revenue budget has traditionally been under great stress because of a meagre annual increase, but the trend seems to be changing. The revenue budget of the forces went up by 15.6 per cent from Rs 2,23,178 crore in 2022-23 to Rs 2,58,002 crore in 2023-24.

It may not be too unrealistic to expect a similar jump in

GUEST COLUMN

the revenue budget for 2024-25, but even if the increase is more modest, it should not be a cause for despair. The MoF has apparently overcome its traditional reluctance to allocate additional funds for revenue expenditure at the revised estimate (RE) stage, if needed by the armed forces. In 2022-23, the revenue budget was enhanced by 12 per cent at the RE stage. There is no reason why it should not be possible to do so in 2024-25 if the need arises.

The long-held view that capital expenditure must be prioritised over revenue expenditure, since the former spurs growth while the latter is only consumptive, is somewhat flawed in the context of the defence budget. Apart from the obligatory expenditure on salaries, ration, and clothing, the revenue budget also caters for operational expenditure on upkeep of the in-service equipment, procurement of ammunition and other ordnance stores, training, transportation of troops and material, and maintenance of the military infrastructure. From an operational perspective, it is as important to ensure adequate funds for this purpose, as it is to allocate funds for acquiring new equipment and capabilities.

Though the armed forces constitute its core, the defence budget is not all about them; other organisations, primarily DRDO, ICG, and BRO are equally important. While DRDO plays a pivotal role in realising the national aspiration of making India self-reliant in military technology, the other two organisations are vital for India's interest in the Indo-Pacific region and checkmating the insidious Chinese expansionism in the Himalayas.

The DRDO is constantly, and often unfairly, targeted for not living up to expectations. It is pilloried for stalled projects (Kaveri Engine), developing prototypes which are not state-of-the-art (Arjun Tank), cost- and time-overrun (Light Combat Aircraft), and much more. Most of the criticism is valid, but the entire blame cannot be assigned to this organisation which has been the primary agency for defence R&D in the country in accordance with the government's policy. Its performance has been affected by many factors, inadequate financial resources being one of them.

The budgetary allocation for DRDO has come down from 0.68 per cent of the total CGE in 2019-20 to 0.52 per cent in 2023-24, while its share in the total defence budget has declined from 4.41 per cent to 3.92 per cent during the same period. The data for leading countries like the USA, Russia, France, and China are not readily available, but it is generally accepted that the allocation for defence R&D in India is too meagre to produce any spectacular results.

It was announced by Nirmala Sitharaman in her budget speech for 2022-23 that defence R&D will be opened to the industry, startups, and academia with 25 per cent of the defence R&D budget earmarked for this purpose. This was to encourage the private sector to take up the design and development of military platforms and equipment in collaboration with DRDO and other organisations through the Strategic Partnership Model. An independent nodal umbrella body was also to be set up to meet wide-ranging testing and certification requirements.

It's not known if there has been any movement on this front in the last two years. None is expected in the immediate run. With the constitution of a nine-member committee in September 2023 to revamp DRDO, and its report still awaited, the status quo in terms of budgetary allocation seems more likely than any substantial increase in allocation.

Meanwhile, because of the focus on maritime security and infrastructure development in Ladakh, the outlay for ICG and BRO has grown at a reasonably healthy compound annual growth rate (CAGR) of 8.04 per cent and 14.23 per cent, respectively. There is no reason to expect any let-up in this momentum.

Defence Pensions remain an important constituent of the defence budget, accounting for more than 23 per cent of the total defence budget of 2023-24. With the payment of arrears on account of the second tranche of One Rank One Pension (OROP) during the year, the RE for 2023-24 is likely to be higher than the initial budget estimates. The trend is likely to continue next year, and thereafter because of the periodic increases on account of OROP. No one seems to have a clue about how to contain this expenditure. The beleaguered Agniveer scheme seems to be no solution, at least in the short and medium terms.

To sum up, the big thing in the next fiscal year will be the general elections to the 18th Lok Sabha. It is but natural that the budget will reflect the imperatives of electoral calculations, though without any major impact on the momentum built up over the past few years of increasing defence outlays. In statistical terms, it could mean earmarking of 13-14 per cent of the total CGE for defence expenditure, in keeping with the past trend. An increase beyond this range would be a bonus.

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–The writer is a Ex-Financial Advisor (Acquisition), Ministry of Defence. The views expressed are personal and do not necessarily reflect the views of Raksha Anirveda

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COVER STORY

AVOIDABLE DOGFIGHT: WHY INDIA SHOULD SHELVE THE MRFA ACQUISITION

The Multi-Role Fighter Aircraft programme to acquire 114 jets is following the path of the failed MMRCA competition. Instead of prolonging the IAF's misery, the government should cancel it and look at indigenous options

By **RAKESH KRISHNAN SIMHA**

For the past two decades, the Indian Air Force (IAF) has grappled with a pressing and distressing issue - its inability to maintain the combat aircraft fleet at the authorised level of 42 squadrons. The challenges faced so far have proven insurmountable, hindering efforts to bolster the fleet. With each squadron sanctioned to have 18 aircraft, achieving the desired strength would result in a combat fleet totalling approximately 756 aircraft, which is only marginally larger than Pakistan's 400 fighters and way below the 1,700 fighters in China's PLA Air Force.

In the 1960s, the IAF was initially authorised to build up to 64 combat aircraft squadrons, a number later reduced to 45 and eventually settled at 42. The current strength hovers around 30 squadrons - a number steadily diminishing due to attrition and the phased-out retirement of ageing aircraft. Projections indicate a further reduction of two squadrons per year over the next five years unless new inductions occur.

It is in this backdrop of falling fleet numbers that the planned acquisition of the 114 Multi-Role Fighter Aircraft (MRFA) and the decision-making process within the IAF have both been a topic of discussion and debate. The MRFA follows the Medium Multi-Role Combat Aircraft (MMRCA) programme, which began in 2007 and sought to acquire 126 aircraft or seven squadrons to enhance the IAF's ageing combat fleet. Six global contenders entered the competition, including the Boeing F/A-18, Lockheed Martin F-16, Dassault Rafale, Eurofighter Typhoon, Mikoyan MiG-35 and Saab JAS 39 Gripen. In 2012 India finally selected the Rafale due to reported lower life-cycle and maintenance costs. However, the deal, valued at more than $30 billion, faced numerous obstacles and was cancelled in July 2015.

COMBAT CRUNCH

The prolonged MMRCA negotiations and eventual cancellation caused a 10-year setback in the IAF's modernisation programme. The retirement of outdated platforms like the MiG-21 and MiG-27 has reduced the IAF's fighter aircraft fleet to approximately 30 squadrons, falling short of the immediate requirement of 42 fully airworthy squadrons required to fight a collusive two-front attack. To address this, India approved the purchase of 36 Rafale aircraft from France as an emergency measure. However, this only fills a portion of the void left by the MMRCA programme, prompting the need for additional measures.

Brig (Retd) Arvind Dhananjayan writes in the Chanakya Forum that this criticality has led the IAF to re-focus on the MRFA, with the aim of finalising the Air Staff Qualitative Requirements. "The acquisition of 114 MRFA with 4.5/ 4+ Generation capability (4th Generation fighters upgraded with Active Electronically Scanned Array radar, enhanced avionics, near-stealth characteristics and the ability to deploy modern aerial weapons) would be imperative to enhance the IAF's fleet by six squadrons to maintain combat parity/edge over the Northern adversary in combat effectiveness in terms of the payload advantage of lower-altitude Indian airfields versus the adversary's high-altitude airfields of the Tibetan Autonomous Region. This induction is imperative as the LCA, even with proposed modifications, will not presently be able to replace the capabilities of the Su-30 MKI or that of the Rafale. Importantly, the PLAAF will, in a similar timeframe, be able to field almost double the number of modern fighters, including 4+ Generation aircraft like the JF-17 Block-III and 5th Generation J-20 fighters. Worryingly, the Pakistan Air Force, with support from China in the form of the JF-17 Block-III and from

The decision to issue a tender for the acquisition of new fighter aircraft implies a broader evaluation of available options and potential collaborations. Or is the IAF stricken with a desire to experience American fighter jets? If yes, it raises questions about the strategic considerations behind such decisions

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Tejas is an evolving fighter with the potential to become a powerful weapons platform like the Su-30 MKI or F-15. However, this can happen only if the IAF persists with its development and provides funding for different iterations of the aircraft

the USA for F-16 upgrades worth US $ 450 Million, is slowly attempting to close the gap."

BETTER OPTIONS

The decision to issue a tender for the acquisition of new fighter aircraft implies a broader evaluation of available options and potential collaborations. Or is the IAF stricken with a desire to experience American fighter jets? If yes, it raises questions about the strategic considerations behind such decisions. Exposure to different platforms can indeed broaden the IAF's operational perspective, but the ultimate choice should align with India's strategic interests, technological requirements, and the long-term vision for its air force.

The IAF needs to follow the path to indigenisation taken by both the army and the navy and fast track the development of indigenous aircraft, including the Tejas Mark 2 and the Advanced Medium Combat Aircraft (AMCA), a 5th Generation stealth, multi-role fighter. Plans are to procure an additional 97 Tejas Mk1A fighters above the 83 already ordered in 2021. Furthermore, 120 Tejas Mark 2 are likely to be ordered. This will reduce dependence on foreign vendors.

Building and enhancing indigenous capabilities can lead to technological advancements, job creation, and reduced dependence on foreign suppliers in the long run. Stressing on indigenisation, an IAF representative submitted before the Parliamentary Standing Committee on Defence: "If we keep buying them from the open market in the world, we will never become self-reliant. So, we need to give a push to our own industry also. We need to hold their hands and the Air Force is committed towards that."

The Tejas took more than 30 years to enter production but the delay was primarily due to American sanctions over India's nuclear tests. Today, with the sanctions lifted, the aircraft

has evolved in tune with the changing technological requirements. According to the IAF's submission to parliament, what was envisioned in the beginning and what it is flying today are two different architectures. "The one we are flying today is called federated architecture. If I can use the word, it is, plug and fly. You can integrate any new weapon or any new system much more easily now," the IAF representative said.

THE CONTENDERS

RAFALE (Dassault Aviation, France): In service and infrastructure-ready, but controversy around the 2015 deal hinders chances. Potential synergy with the navalised Rafale-M for the Indian Navy's carrier aircraft adds strategic value

F-15 EAGLE II (Boeing, USA): Surprise entrant with an impressive combat track record, considered formidable in the competition

SUKHOI SU-35 (UAC, Russia): Latest from Sukhoi's 'Flanker' family, offers commonality with IAF's Su-30MKIs but faces political complexities due to Russia's diplomatic isolation

JAS 39 E/F GRIPEN (Saab, Sweden): Cost-effective single-engine option, viewed as an underdog with potential cost advantages

F-21 (Lockheed Martin, USA): Single-engine, advanced version of the legacy F-16, rebranded for the contest. Overcoming historical roadblocks, it aims for success with the backing of the present US Government

EUROFIGHTER TYPHOON (Eurofighter): Co-frontrunner in previous contests, lost to Rafale. Twin-engine jet led by Airbus, claims previous rejection was unfair

F/A-18E/F SUPER HORNET (Boeing, USA): Twin-engine contender with AESA radar, capable and a long-time participant in the IAF's contest

MiG-35 (UAC, Russia): Twin-engine multirole fighter with limited chances, a modernised version of the legacy MiG-29. IAF signals a preference for other options

Further, the subcommittee was informed that as far as avionics, airframe and other parts are concerned, the IAF is very close to where the world is, except for some technologies like actuators, which are undergoing flight testing at the moment. Also, critical technologies like fly-by-wire are not shared by anyone and were developed indigenously. Clearly, the Tejas is an evolving fighter with the potential to become a powerful weapons platform like the Su-30 MKI or F-15. However, this can happen only if the IAF persists with its development and provides funding for different iterations of the aircraft.

OLD HABITS DIE HARD

If there is a defining aspect of the IAF brass, it is that they waste a lot of time evaluating fighters. The culture of quick decision making and induction of aircraft has not taken root in the service. Only after the later Defence Minister Manohar Parrikar forced the IAF to buy the Tejas and then finalised the Rafale deal did things move forward. Compared to the IAF, the PAF is more nimble and manages to acquire aircraft in a timely manner.

During the 1999 Kargil War, the IAF had the edge in Air to Air Missiles (AAMs) with the Russian R-73, but by the time the Balakot strike happened the PAF had the much longer range AMRAM. That was a classic example of shortsighted planning at Air Headquarters, or perhaps because Air Chief Marshal S.P. Tyagi was too busy taking kickbacks from Italy.

In summary, the MRFA programme becomes crucial to address the immediate gaps in the IAF's fleet and expedite modernisation efforts. While initiatives like the purchase of Rafale and the development of the Tejas contribute to self-reliance, the complexities of production timelines and impending fleet obsolescence necessitate a comprehensive approach to ensure India's air superiority in the evolving geopolitical landscape.

CONCLUSION

Brig (Retd) Dhananjayan adds that while preparing and 'right-sizing' it's fighter fleet, the IAF would do well to keep in mind the durability and sustainability of this newly acquired fleet, in terms of ease of operability, commonality, transfer of technology, upgradability and maintainability. "This multi-pronged approach towards selecting the MRFA would ensure a less-diverse fleet, with scalable/upgradable platforms and a longer service with the IAF and the nation."

In the rapidly evolving landscape of military aviation, the choice of aircraft must align with current and future operational requirements. If the MRFA falls short in terms of technological advancements and fails to meet the IAF's expectations, it raises questions about the decision-making process.

– 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 of the writer and do not necessarily reflect the views of ***Raksha Anirveda***

In the rapidly evolving landscape of military aviation, the choice of aircraft must align with current and future operational requirements. If the MRFA falls short in terms of technological advancements and fails to meet the IAF's expectations, it raises questions about the decision-making process

LEAD STORY

MULTIPOLARITY LOOMING OVER EUROPEAN PARTNERSHIPS

Europe and India share a desire for global stability, democratic plurality and independence, and a controlled level of economic dependence over China. The partnership between India and European countries has yielded many advances in technology, trade and strategy. The aim has been mutual reinforcement on all levels, ranging from defence to economics, and global influence and stability. However, the Indo-European partnerships could eventually be threatened by varying conceptions of the underlying concept of multipolarity

By **NATALIA FREYTON**

Twenty five years ago, India inked its first strategic partnership with a European nation. A quarter of a century later, the partnership has yielded many advances in technology, trade and strategy. Such partnerships are rich in potential, but could eventually be threatened by varying conceptions of the underlying concept of multipolarity.

ONGOING DEFENCE ENDEAVOURS

The EU's first contact with India started as early as 1962 1, when the ancestor of the EU, the CEE was just nascent. The aim has been mutual reinforcement, on all levels, ranging from defence to economics, and global influence and stability. Sixty years later, this partnership is still vibrant and active in addressing 21st-century challenges. Europe and India share a desire for global stability, democratic plurality and independence, and a controlled level of economic dependence over China. This general conception also influences relationships between countries, and their defence approach.

India cooperates with Italy 2, to uphold its operability with European nations. In early 2023, the relationship was also elevated to the rank of Strategic Partnership. However, due to its young age, the interactions are, for the time being, limited to information sharing and common military training. In 2021, the Indian Navy conducted training 3 alongside the Italian Navy. On the economic side, the trade balance rested 4 at nearly 15 billion euros in 2022, slightly in favor of India. But some European nations work with India at a higher level.

In July of 2023, German Defence Minister Boris Pistorius met with Indian counterpart Rajnath Singh, to discuss Germany's potential participation in India's desire to further its industrial development and the resilience of its supply chain. India is a major defence client, and Germany a global producer. Military supply chains are notoriously robust and can serve as basis and inspiration for civilian equivalents. Germany's

trade balance 5 with India nearly reached 25 billion euros in 2022, in steady increase. India is cooperating with many other European nations, sometimes at a far more advanced stage than with Germany.

In November of 2021, New Delhi and London reinforced 6 their cooperation capacity, based on information sharing at the global level, and maritime security at the regional one. This partnership also has an industrial facet. Times of India explains 7; "India and the UK on Friday discussed measures to further strengthen their defence cooperation through joint exercises, maritime domain awareness and information exchange as well as defence-industrial collaboration proposals in missile systems and electric propulsion for warships." With Brexit, Commonwealth relationships reinvested a new influx of relevance, as explained 8 by analyst Facundo Arrizabalga: "By voting to leave the European Union, Britain's future relationship with its fellow Commonwealth members has assumed both a greater significance and a greater degree of uncertainty." In this regard, relations and approaches between the most powerful Commonwealth nations, both major naval players, gain in momentum, especially as coastline Rimland nations turned towards the Asia Pacific region.

India's cooperation with France is even more advanced. Hindu Business Line writes 9: "India is seeking cooperation for jointly working on projects including maritime technologies, land warfare systems and equipment, robotics, autonomous vehicles and platforms and cyber defence. Additionally, India is keen that indigenous companies get access to the French market for crucial global exposure which

India, as the world's first demographic powerhouse, can simply not be overlooked by its European partners. The trade balance is in favour of India, indicating Europe's rising need for Indian cooperation. India is now integral to the European pharmaceutical industry and web-based services

LEAD STORY

India cultivates its relationships with the United States and all of its close allies, and conducted naval training drills with both the Japanese and the Australian navies. But all the while, it cooperates with China, namely through the BRICS initiative, in stark contrast with US desires, and those of other Western nations

will facilitate development of a military-industrial ecosystem." France is a major defence partner for India: not only have major military contracts long been inked between the two countries, but all exchanges occur within a diplomatically-sealed framework named the Indo-French Strategic Partnership 10. This bilateral resolution goes back a quarter of a century and has permitted major achievements, with the Scorpene 11 and Rafale 12 contracts as latest embodiments. The balance trade 13 between India and France jumped to 15 billion euros in 2022, with 11 billion euros worth of FDI, placing it at the 11th position and rising.

All of these partnerships vary in size and intensity, amounting to 14 roughly 90 billion euros of trade between India and EU nations altogether in 2021, much of which tech and defence. However, they all serve the common purpose of enhancing security and bolstering industrial exchanges for each member. Also, these partnerships place a particular focus on defence endeavours, but are not limited to them, as they oftentimes carry a civilian purpose as well. Most of all, they embody a common vision of geopolitical matters.

SHARED INTERESTS BEYOND BORDERS

Europe vitally needs to maintain exports 15, as a whole, if it is to remain competitive and survive on the global defence market, where US, Chinese, Israeli and Russian production keeps the pressure high. European nations, individually, also need to export, lest keeping their industries simply become too expensive and they lose their strategic independence. All domestically-sourced supplies place a heavy burden on the producing country, and exports enable the reduction of costs, production of synergies, and absorb Research and Development costs. Having the same equipment used in various theatres also helps the producers improve the quality of their equipment, with operational feedback. The atrociously expensive 16 F-35 program eventually turned into a commercial triumph, confirming how exports are vital to all military programs and what 1990s Lockheed Martin CEO Augustine had previously stated: "Initially, development costs are stratospheric and almost always higher than expected because there's actual invention involved, and the innovation process is unpredictable. But then costs can decline as companies refine their production process and more units are sold to the U.S. and allies."

Military contracts also enact diplomatic alliances, and strengthen shared geopolitical visions. India, as the world's first demographic powerhouse, can simply not be overlooked by its European partners. The World Bank states 17 that "in 2022, India emerged as one of the fastest growing economies in the world [...]. Growth was underpinned by robust domestic demand, strong investment activity bolstered by the government's push for investment in infrastructure, and buoyant private consumption, particularly among higher income earners." For European nations which are struggling to get rid of the wake of recent crises, such as Covid-19 18, energy supplies disrupted 19 by the Ukrainian war, developing ties with the Indian market is beyond common sense: doing away with it is not an option.

Indeed, the trade balance is in favour of India, indicating Europe's rising need for Indian cooperation. India is now integral to the European pharmaceutical industry 20 and web-based services 21. In return, and quite symbolically, France announced its intention in early 2023 to transfer its best available defence 22 technologies to India. This effort, not limited to this particular country, is an additional argument towards strengthening the partnership, as it lines up with PM Modi's Make in India policy, India's central development effort.

India is also able to ensure its independence by broadening its defence supplier base 23, something European nations are in the best position to do, with their active and varied defence market. This policy has two discrete, yet complementary aspects: defensively, the goal is to limit dependencies by diluting them with one another. Proactively, it aims to prove that India can talk eye-to-eye with the entire world about aspects as vital as defence, prove its impartiality and enact its multilateral vision of strategic relations.

HISTORICAL CONTEXT, GEOPOLITICAL CONSIDERATIONS, AND FUTURE TRAJECTORY

Some of these relations go far back, especially considering India's young age as a free and independent democracy. The partnerships are beneficial in all respects, and all the more so in the case of Strategic Partnerships. All of them rest on a currently common, shared and compatible vision of what multilateralism is - a base which has remained stable over the past decades, but could change in the future if strategic shifts occur.

India cultivates its relationships with the United States and all of its close allies. Indian News services reported 24 in July of 2023 how India had conducted naval training drills with both the Japanese and the Australian navies. But all the while, it cooperates with China, namely through the BRICS initiative, despite its northern neighbour being a regional competitor in direct interest areas, and regional influence in the far east and Asia, in stark contrast with US desires, and those of other Western nations. In the wake of the Johannesburg BRICS summit, in August of 2023, the Chinese embassy in New Delhi stated 25: "The two sides should bear in mind the overall interests of their bilateral relations and handle properly the border issue so as to jointly safeguard peace and tranquillity in the border region.

European commitment to this regional balance can, sometimes, be somewhat self-centred, or based on theoretical values and the US alliance. In this regard, Europe could be seen more as a counter-balance, than a contributor to the multipolar world India envisions. French president Macron's posture, who diverged from US policy 26 regarding China, is an exception and can be considered as simple PR, as it was followed by neither supporting decisions nor facts.

Should the conceptions and approaches of multilateralism amongst partners part ways, the entire equilibrium would be disrupted. India asserted its own position in the wake of the Russo-Ukrainian conflict. This has been, at times, interpreted by western commentators as a new global configuration 27 into "blocs", with the West on one side and the BRICS sphere of influence on the other.

The current global situation nearly guarantees this alignment will not be threatened in the near future, if only by the pragmatic interests of the involved parties. But in the future, these "natural partnerships" may be subjected to potent forces. They should therefore be surveyed, and necessary adjustments should be carried out, and not turned into bones of contention.

–The writer is a defence and security industry consultant having varied experience working with medium and large companies majorly in European market. The views expressed are of the writer and do not necessarily reflect the views of ***Raksha Anirveda***

Europe could be seen more as a counter-balance, than a contributor to the multipolar world India envisions. India asserted its position in the wake of the Russo-Ukrainian conflict

SPOTLIGHT

INDIAN NAVY SUCCESSFULLY COMPLETES MAIDEN PILOT AND MAINTAINER TRAINING OF THE UNMANNED SHIPBORNE AERIAL SYSTEM CAMCOPTER® S-100

Kochi: With increasing focus on maritime power at high seas with a special focus on the Indian and Pacific Ocean, the induction of the CAMCOPTER® S-100 into the Indian Navy got a massive boost.

The Indian Navy has successfully completed its maiden pilot and maintainer training of the CAMCOPTER® S-100 at INS Garuda, Kochi. Commodore K Sri Vatsa, CO Garuda recently presented the graduation certificates to qualified operators. The induction of the Schiebel CAMCOPTER® S-100s will enhance surveillance and tactical capability of Indian Navy in Indian Ocean Region (IOR).

The CAMCOPTER® S-100 is an unmanned aerial vehicle (UAV) using a rotorcraft design. Developed in between 2003-2005, S-100 has a maximum take-off weight (MTOW) of 200 kg with 6 hours endurance (extendable to over 10 hours with optional external AVCAT fuel tanks fitted). It has a maximum speed of 220 km/hr and a ceiling of 5,500 m. It is powered by a heavy fuel engine and has the capability to carry a host of / multiple payloads which are surveillance as well as tactical in nature. Indian Navy joins a host of nations operating this unmanned system in the maritime domain. The primary radio link between ground station and the air vehicle is in C-band and the secondary link operates in the UHF region.

Manufactured by Schiebel in partnership with VEM Technologies, Hyderabad - the world's leading Rotary Unmanned Aerial System (UAS) CAMCOPTER® S-100 featuring the script of the Indian Navy and the roundel of India on the airframe was showcased at the Aero India 2023 show in Bengaluru.

Schiebel Systems India – a subsidiary of the Schiebel Group, the original equipment manufacturer of the S-100 UAS – and local firm VEM Technologies have joined hands for the production of CAMCOPTER® S-100 in India. The Indian Navy intends to deploy the NSUAS on naval vessels over 100 m in length.

On June 28, 2022, a Request for Information (RFI) was issued to facilitate Indian Navy's acquisition of forty (40) Naval Shipborne Unmanned Aerial Systems (NSUAS). In the RFI, the Indian Ministry of Defence (MoD) and the Indian Navy said the NSUAS will be used for surveillance missions, signals intelligence (SIGINT), target acquisition, reconnaissance, and maritime domain awareness around a naval task group. Secondary roles include anti-piracy measures, anti-terrorist activities, and search-and-rescue support. The programme is still progressing as indicated by Indian Navy and will ensure availability of tactical and surveillance capability on board all major naval warships.

The UAS CAMCOPTER® S-100 is being placed in active service by the Indian Navy, marking a noteworthy advancement in the modernisation of its naval capabilities. Once fully inducted, the system represents a significant advancement in naval innovation and supports the country's aspiration to incorporate state-of-the-art technologies. The first crew batch's local training has been successfully finished, demonstrating the Indian Navy's readiness to use and optimise the capabilities of this cutting-edge unmanned aerial vehicle.

The cooperation of Hyderabad-based VEM Technologies Pvt. Ltd. and Schiebel led to the introduction of the CAMCOPTER® S-100 into the Indian Navy. They have collaborated to offer the CAMCOPTER® S-100 in response to the Indian Navy's requirements. In response to the new Indian Navy requirement, Schiebel Systems India and VEM Technologies plan to produce the vertical take-off and landing (VTOL)-capable CAMCOPTER® S-100 and gradually maximise the local content along with the assembly and integration of payloads. This partnership showcases the fine blend of local knowledge and foreign technology and giving India's maritime troop access to cutting-edge unmanned aerial systems.

The CAMCOPTER® S-100 is an adaptable unmanned aerial system that provides naval operations with a variety of capabilities. With its cutting-edge sensors and communication systems, it improves situational awareness, surveillance, and reconnaissance at sea. Its small size and capability to operate from ship decks make it a crucial instrument for maritime operations, enabling the Indian Navy to increase its reach and efficacy. The arrival of the Schiebel's CAMCOPTER® S-100 is in line with this strategic objective, displaying a proactive approach to solving modern maritime challenges.

The induction of the Schiebel CAMCOPTER® S-100s will enhance surveillance and tactical capability of Indian Navy in Indian Ocean Region (IOR)

ANALYSIS

NAVIGATING THE STRAINS

India and the UK engage in diplomatic manoeuvres to address challenges in their defence ties. Recent dialogues, notably the 2+2 and Defence Consultative Group meetings, signal a potential way forward. Nevertheless, obstacles arise from the presence of pro-Khalistan elements in the UK and divergent perspectives on the Ukraine conflict. The introduction of initiatives like "Defence Partnership India" and prospective collaborations with Rolls Royce in aero-engine technology hint at a cautious optimism prevailing in the bilateral relationship

By **SRI KRISHNA**

Indo-UK defence relations received a significant boost during the three-day visit of Defence Minister Rajnath Singh to London from January 8 to 10, marking a landmark in the ties between the two nations after a hiatus of 22 years. The visit not only symbolised a substantial improvement in bilateral relations but also showcased the building of trust, notwithstanding differences over the Russia-Ukraine war.

One of the primary challenges faced by Indo-UK defence ties is the hesitancy of the UK defence industry to engage boldly with India, in contrast to their counterparts in the US and France.

NEW VISTAS IN RELATIONSHIP

During his visit, Defence Minister Singh, on the concluding day, co-chaired the UK-India Defence Industry CEOs Roundtable with his UK counterpart, Grant Shapps, at Trinity House, London. The meeting witnessed the participation of top UK defence industry leaders, Ministry of Defence (MoD) officials, and representatives from major companies such as BAE Systems, Thales UK, and SAAB UK.

In the roundtable discussions, both ministers expressed their appreciation for the investment and technology collaboration, underscoring India's skilled workforce, pro-Foreign Direct Investment (FDI) environment, and expansive domestic market. Minister Singh focused on India's ambitious development goals under Prime Minister Narendra Modi and expressed optimism that India would attain developed economy status by 2047.

Rajnath Singh and his British counterpart, Shapps, emphasised the symbiotic relationship between India and the UK, envisioning a strategic partnership for cooperation and innovation beyond a mere buyer-seller relationship. UK industry leaders outlined plans for joint efforts in aero-engines, electric propulsion, missiles, power-packs, and maritime systems. The Defence Minister commended the enthusiasm of UK CEOs for collaboration with Indian companies.

The visit encompassed a bilateral meeting, culminating in agreements on a cadet exchange program and defence collaboration in research and development between the Defence Research and Development Organisation (DRDO) and the UK's Defence Science and Technology Laboratory (DSTL). This development signifies a step forward in fostering deeper ties and mutual cooperation between the defence establishments of both nations.

GOING BEYOND THE PAST

The planned visit to the UK in the summer of 2022 by Defence Minister Singh was unexpectedly cancelled by India for 'protocol' reasons. However, the underlying cause was the perceived difficulty in engaging meaningfully with the then UK Defence Secretary Ben Wallace, who considered India as not being aligned on the Ukraine war. Following the appointment of his successor, Grant Shapps, a significant shift occurred, marked by an inaugural meeting of the '2+2' foreign and defence dialogue at the Director General level in October 2023, followed by the Defence Consultative Group meeting at Permanent Secretary level in November 2023.

'Defence and Security' stand as one of the five 'pillars' of the India-UK 2030 Roadmap, initiated by Prime Ministers Narendra Modi and Boris Johnson in May 2021. This roadmap outlines a unique ten-year bilateral plan aimed at prioritising and elevating ties to a Comprehensive Strategic Partnership. At the G20 summit in New Delhi in September 2023, Prime Ministers Modi and Sunak mutually agreed to establish 'a modern partnership in cutting-edge defence technology, trade, and innovation.'

The UK government has expressed support for India's aspirations to develop its defence industry, with the aim of reducing dependence on Russian military equipment. Notably, in April 2022, the UK issued an India-specific open general-export license, the first granted to an Indo-Pacific country. This license allows exports of specific military and dual-use goods and technology. Additionally, in September 2023, the UK launched Defence Partnership India, a new organization under the Ministry of Defence, aimed at enhancing bilateral defence ties.

LINGERING COMPLEXITIES

Despite these positive initiatives, there has been a lack of significant collaboration between India and the UK concerning defence capabilities. Implementation challenges stem from industry dynamics rather than government policies, highlighting a noticeable lack of coordination and cooperation between the two nations. The 'three-I' challenge, as described by an IISS Strategic Comment in November 2023, poses obstacles for UK companies in their engagements with India.

There are also concerns regarding the potential diversion of sensitive technologies from India to Russia, a claim vehemently challenged by the Indian government. Defence Minister Singh's upcoming visit could prove pivotal in advancing significant collaborative projects at a political level. Key among these is the co-development and co-creation of gas-turbine propulsion technology by Rolls-Royce and India's DRDO for the next generation of Indian fighter-aircraft engines. Other crucial projects include the recent partnership for naval electric propulsion between

At the G20 summit in New Delhi in September 2023, Prime Ministers Modi and Sunak mutually agreed to establish 'a modern partnership in cutting-edge defence technology, trade, and innovation

the Indian government and GE (Naval), UK, as well as Rolls-Royce, and the procurement of ground-based air defence systems from MBDA (UK).

However, the ministerial visit occurs against the backdrop of noteworthy developments, including the closure of the DRDO office in the Indian High Commission in London. Its sole representative has been relocated to France. Concurrently, the Indian Ministry of Defence, as part of a rationalisation process, has reduced its military representation in London from three one-star officers to a single officer.

Additional challenges arise from allegations of official Indian involvement in targeted assassinations or assassination attempts in the US and Canada. Furthermore, there is a surge in Sikh separatist (Khalistani) extremism in the UK, particularly noteworthy amidst the upcoming general elections in both India (May-June 2024) and the UK (second half of the year). This surge occurs in the absence of a finalised bilateral Free Trade Agreement.

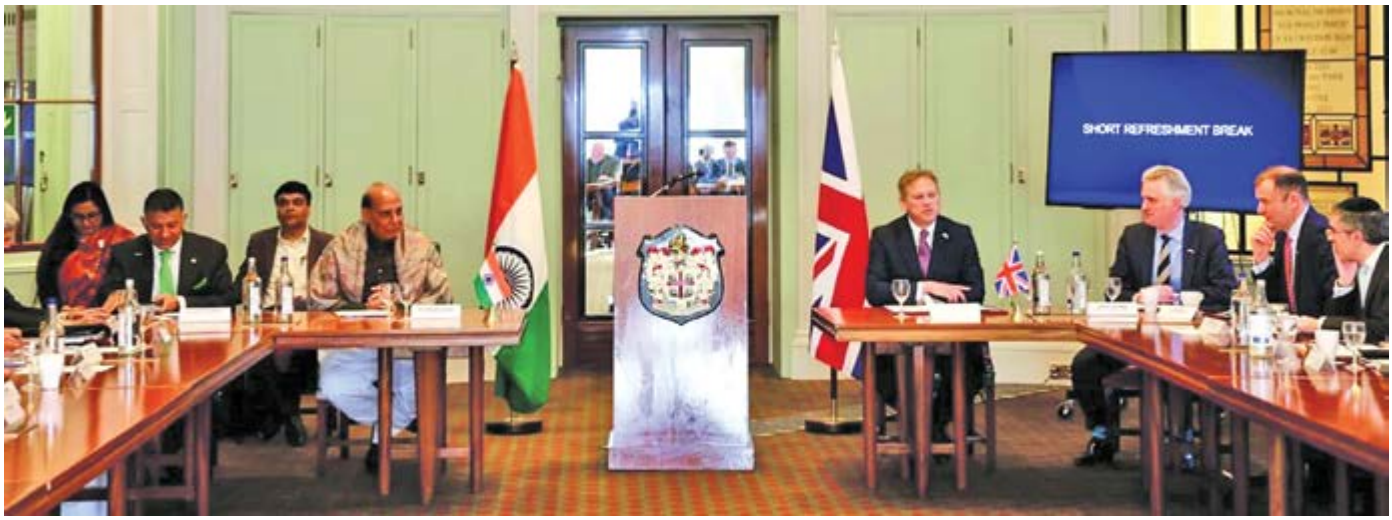
Nevertheless, a significant development transpired during the meeting between Indian and UK leaders on the sidelines of the September 2023 G20 Summit in New Delhi. According to a Downing Street spokesperson, they concurred on building 'a modern partnership in cutting-edge defence technology, trade, and innovation.' This commitment entails new collaborations in defence-industrial production and research and development, aligning with the objectives outlined in the '2030 Roadmap for India–UK Future Relations,' a bilateral policy document signed in May 2021 under the leadership of former Prime Minister Boris Johnson.

In practice, however, there has been a lack of significant collaboration between India and the UK in terms of defence capabilities. A substantial contributing factor is the perception of British companies, who still view India as a challenging market due to its protectionist defence-industrial policies. It is worth noting that these policies have undergone significant changes since 2020. Despite these challenges, both countries recognise the value of drawing closer and implementing decisions taken during the prime ministerial-level summits held earlier. Efforts to overcome barriers and foster meaningful cooperation remain essential for the successful realisation of the envisioned modern partnership.

The planned visit to the UK in the summer of 2022 by Defence Minister Singh was unexpectedly cancelled by India for 'protocol' reasons. However, the underlying cause was the perceived difficulty in engaging meaningfully with the then UK Defence Secretary Ben Wallace, who considered India as not being aligned on the Ukraine war

NEW BEGINNINGS

In October 2023, the diplomatic and defence ties between India and the UK saw significant progress with their inaugural 2+2 foreign and defence dialogue, conducted at the joint secretary level. This positive momentum continued with a subsequent meeting of the Defence Consultative Group in November, where discussions took place at the level of the defence secretary. Adding to these developments, the British Ministry of Defence introduced a new initiative named "Defence Partnership India" in late November, emphasising the commitment to fortify bilateral defence cooperation.



India's interest in fostering collaboration with the UK extends beyond traditional areas, including a keen focus on aviation matters. One potential avenue is in aero-engine technology, where Rolls Royce has expressed its willingness to collaborate with the Defence Research and Development Organisation (DRDO) in designing and developing jet engines for the Indian Air Force's Advanced Medium Combat Aircraft (AMCA). The AMCA is slated to become the cornerstone of India's fifth-generation aircraft fleet by the 2030s. Another promising prospect involves a partnership between Rolls Royce subsidiary MTU, a specialist tank engine manufacturer, to develop a power plant for India's proposed light tanks designed for deployment in the country's mountainous regions.

Additionally, there exists the possibility of India participating in the UK's sixth-generation fighter programme, which involves collaboration with Sweden, Italy, and Japan. While India is presently directing its focus towards the development of the AMCA, other countries have commenced efforts on their sixth-generation fighter designs. Although

Additional challenges arise from allegations of official Indian involvement in targeted assassinations or assassination attempts in the US and Canada. Furthermore, there is a surge in Sikh separatist (Khalistani) extremism in the UK, particularly noteworthy amidst the upcoming general elections in both India (May-June 2024) and the UK (second half of the year)

significant collaborative ventures between India and the UK in the realm of defence have been limited in recent times, the flurry of recent decisions and discussions indicates a potential shift in this trajectory. The evolving landscape suggests that a change in the nature and depth of India-UK defence collaboration may be on the horizon.

*– 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***

ANALYSIS

WILL INDIA-CHINA RELATIONS

By **VINAY KUMAR**

Indo-China relations, which have been on a downswing since 2020, show no signs of any rapprochement in the near future, and the current stiffness between two neighbours may continue in 2024 too

India-China relations are witnessing an all-time low after the military standoff at the Line of Actual Control (LAC) between the two neighbours that has gone on since the summer of 2020 and is all set to enter the fourth year. Even after long meandering talks that have stretched to 22 rounds, so far, between the high-ranking military officials of the two countries, a solution has eluded both sides.

India has time and again stressed that China should restore normalcy on the LAC to bring about normalcy in the bilateral ties.

External Affairs Minister S Jaishankar recently enunciated his assessment of India's thought process while dealing with China. He was forthright in stating that India should deal with China on the basis of 'realism' and bilateral relations should be based on mutual understanding with respect, sensitivity and interest.

BE NORMAL?

While speaking to a news agency to mark the release of his new book Why Bharat Matters, he said that part of today's problem was that because in 2020, agreements were disregarded and the mutuality on which this whole relationship is predicated has not been followed. He said that a lot would depend on what the Chinese policy is. Arguing for dealing with China with a policy steeped in realism, he felt the strain of realism should allow India to have a certain approach.

It would be seen in the months to come how India is able to deal with China on the basis of realism as pointed out by the External Affairs Minister as New Delhi can hardly ignore the threat which Beijing poses. The bilateral relationship today has become more complicated after the deadly clash that took place in Galwan, Ladakh in which 20 Indian soldiers were martyred. Since then relations between the two neighbours have seen a shift towards anxieties, threat of a military build-up along the border and heightened tensions. India's top military brass has favoured steps to de-escalate the situation while calling for restraint from personnel from both the armies.

India has pointed out that maintaining peace and tranquillity along the border was a prerequisite for restoring normalcy in its relations with China. The border clashes and the tense situation cannot be allowed to be circumvented by China while carrying on with other aspects of the bilateral ties. Clearly, it is not business as usual in bilateral relations.

Ahead of Army Day this year, India's Army Chief General Manoj Pande said the situation along the LAC is 'stable' but 'sensitive'. He asserted that Indian troops are maintaining a 'high state' of preparedness to deal with any challenge. General Pande said that both India and China have continued to hold talks at military and diplomatic levels to resolve the remaining issues.

The Army Chief said that operational preparedness continues to be at a high level. He said that the Army is maintaining adequate reserves to confront any security challenges in the region.

Given the assertions by both the External Affairs Minister and the Army Chief, it is amply clear that military and diplomatic talks with China for disengaging from friction points in Eastern Ladakh and a return to the pre-2020 summer position will be a long drawn process and will test India's endurance and patience. Though from the late 80s, India and China have shaped their diplomatic and economic ties in a positive manner, it was since 2013 that border disputes have come up during regular intervals across different sectors that have marred the bilateral relations.

According to strategic experts, China has taken note of India's growing closeness and expanding of strategic and security ties with the United States and its membership of the Quadrilateral Security Dialogue (QUAD) along with Australia, Japan and the US. There are firm indications that both India and China are increasing their influence on several global platforms. This also indicates that China will play along in the long term to advance its trade and business interests while continuing with holding border talks with India, which may end in a stalemate.

Looking at the economic ties, it is clear that trade and economic relations between India

S Jaishankar says that part of today's problem is that in 2020, agreements were disregarded and the mutuality on which this whole relationship is predicated was not followed

ANALYSIS

Both India and China are increasing their influence on several global platforms. China will play along in the long term to advance its trade and business interests while continuing with holding border talks with India, which may end in a stalemate

and China have seen progress over the past few years. India-China bilateral trade, which was US $2.92 billion in 2000, grew to US $41.85 billion in 2008.

By 2014, according to official figures, India-China bilateral trade stood at US $70.65 billion. India's exports to China touched US $16.41 billion whereas China's exports were US $54.42 billion. However, India still faces a growing trade deficit vis-à-vis China and it reached US $83.2 billion in 2022-23. Chinese exports to India also fell to US $107.27 billion in January-November 2023, data from the General Administration of Customs of the People's Republic of China (GACC) shows.

The pattern that has continued over the past three years is likely to continue in 2024 as well. In a year of national elections, Prime Minister Narendra Modi cannot be seen as talking to China from a weak position before the electorate. This indicates that bilateral relations are likely to drag on along the same line in the near future as well. At the global forum like the BRICS summit in South Africa, both Prime Minister Modi and Chinese President Xi Jinping had a cursory and unproductive engagement. Xi also decided to miss the G-20 Summit, which was hosted by India in New Delhi, last year.

On its part, over the past decade or so, India has stepped up its efforts in a major manner to build and upgrade border infrastructure and carry on development projects in border areas ranging from Ladakh to Arunachal Pradesh. From meagre allocations, funds for upgrading border infrastructure have seen a major boost to the tune of nearly Rs. 15,000 crores over the past decade or so.

All this suggests that from India's point of view it cannot be business as usual with China in the near foreseeable future.

–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***

MEHAIR PLACES ORDER FOR 20 ZEROAVIA ZA600 HYDROGEN-ELECTRIC ENGINES

Regional operator targets retrofit of Cessna Caravan platform to drive clean flight

Hollister, CA & Kemble, UK: ZeroAvia today announced that MEHAIR has placed a conditional order for up to 20 ZA600 hydrogen-electric engines. The order adds to the over 2,000 engine pre-orders secured by ZeroAvia.

MEHAIR (Maritime Energy Heli Air Services Pvt Ltd.) has historically offered services across the Indian sub-continent, commencing with the Andaman and Nicobar Islands in 2011. The company now has ambitious plans to grow across a range of sub-regional routes across India with both amphibian and wheeled aircraft.

MEHAIR will explore a range of options for financing the acquisition and retrofit of the engines to its upcoming fleet of 10 Cessna Caravan aircraft, including working with potential leasing partners. The company already has a relationship with MONTE as its preferred ZA600 lessor partner. ZeroAvia and MEHAIR will also work together on establishing the fuel supply for the operator's services across India.

ZeroAvia plans to certify the ZA600 by the end of 2025 and is already working closely with the UK's CAA as well as other regulators to ensure harmonization and rapid certification globally.

India has big aspirations to use hydrogen as a key enabler of its clean energy future, particularly in hard-to-abate sectors like aviation, and to deliver net zero by 2070. A target of reaching 5 million metric tons of hydrogen production per annum has been set for 2030.

Aviation too is growing dramatically across the country, with passenger numbers more than doubling over the last decade and more than 500m passengers per annum predicted by 2030 according to CAPA, India.

James Peck, Chief Customer Officer, ZeroAvia, said: "The rapid increase in demand for flights will be a key driver of economic growth and social and cultural exchange, but clean flight technology will be essential to ensure it does not derail net zero progress. Hydrogen fuel cell propulsion can offer lower operating costs and zero-emission flight, driving a rapid increase in regional aviation and support dramatic expansion of MEHAIR's operations."

Siddharth Verma, Managing Director, MEHAIR, said: "Operating under the highly successful UDAN Scheme, Govt of India, amphibian and other small-wheeled aircraft can provide the much needed 'last-mile' connectivity by bringing in a seamless network of runways and waterways, all the while offering an exceptional experience for passengers and boosting local economies. Aligning with the Govt's vision of sustainable aviation, we believe we need to find sustainable ways to power our operations in the future, and we're excited by what ZeroAvia's technology offers and the progress demonstrated so far. We hope to spearhead this new revolution in partnership with ZeroAvia and the Government of India."

Hydrogen-electric engines use hydrogen in fuel cells to generate electricity, which is then used to power electric motors to turn the aircraft's propellers. The only emission is water.

OPINION

JAISHANKAR'S RUSSIA VISIT: HOLDING MIRROR TO THE US

India's bilateral ties with the US and Russia are poles apart, while the former adopts double standards in its relationship, the ties with Russia have withstood tests during turbulent times. That's why India has always favoured a multi-polar world with Russia as a strong nation and not a weakened one

By **SHANKAR KUMAR**

Those who took US President Joe Biden's refusal to accept India's invitation to become the Chief Guest at the country's Republic Day function as a snub to New Delhi, they would be surprised by the South Asian country's resilience and speed to take a decision to show Washington DC its place and weight in the international power politics.

With just one phone call, French President Emmanuel Macron agreed to become the Chief Guest at the Republic Day function, while External Affairs Minister S Jaishankar moved the direction of his plane to Russia, giving pro-American lobbies inside and outside the country a shock that they never expected New Delhi would dare to give.

However, all this happened not before Prime Minister Narendra Modi in an interview with the Financial Times set the record straight on India's relations with the US and New Delhi's readiness to investigate any information on alleged Indian official's hand in the foiled attempt to kill Gurpatwant Singh Pannun, a US citizen who has been designated as a terrorist in India.

The PM's interview took the wind out of India haters, especially western media's sails, as it helped in scotching reports, which suggested that New Delhi's relations with Washington DC would be jeopardised if the former did not cooperate in seeking truth on the Pannun issue. It also paved the way for India making the next significant move on the chessboard of international geopolitics: India sent EAM S Jaishankar to Russia on a five-day visit.

But die was cast when during a meeting with his Russian counterpart Sergey Lavrov in Moscow; Jaishankar discussed plans on joint production of military equipment besides other issues of bilateral and global importance. The Russian Foreign Minister disclosed this during a joint press briefing with S Jaishankar in Moscow.

Lavrov said the two talked about the prospects of military and technical cooperation, including the joint manufacturing of modern weapons. India needs Russian expertise in the production of critical defence platforms like nuclear submarines, stealth frigates, cruise missiles and fighter aircraft. Besides, India is waiting for the delivery of two of the total five Almaz-Antey S-400 Triumf self-propelled surface-to-air missile systems, four Admiral Grigorovich Project 1135.6M frigates and leasing of an Akula class nuclear powered submarine from Russia.

Due to the Ukraine war and consequent sanctions imposed by the US and its western allies, Russia is not able to fulfil its delivery commitment to India. These sanctions could be outweighed when the on-going Ukraine war comes to an end. There is a feeling amongst defence and strategic experts that after the start of the Israel-Hamas war and the US preoccupation with it, Washington DC may be diverting arms supplies to Israel originally intended for Ukraine.

"The war between Israel and Hamas is bad news for Ukraine. The conflict has already shifted news coverage and public attention in the West away from Russian aggression. It may also force Western exporters to divert portions of their arms supplies from Ukraine to Israel, as the United States is already thought to have done," the US-based magazine Foreign Policy said in its recent article.

This means the Ukraine war will not possibly drag on for more months and years. In this context, close collaboration between India and Russia in the defence area in the coming days will not be a far-fetched affair, feel some experts who otherwise see the timing of Jaishankar's visit to Russia as crucial. In fact, the EAM's visit took place at a time when international geopolitics is witnessing challenges both strategically and economically and each big power wants the world to follow its dictates.

Therefore, when Jaishankar got a rare chance to meet Vladimir Putin to whom he also handed over Prime Minister Narendra Modi's personal letter, the Russian President reportedly maintained that relations between the two countries are progressing even amid turbulent times.

There is no denying the fact that in spite of the US and western countries' pressures on India to condemn Russia and sever its trade ties with Moscow in the wake of the Ukraine war, New Delhi has stood by its time-tested friend, Russia. To this, EAM Jaishankar's readiness to accept President Putin's invitation for Prime Minister Modi to visit

Russia in 2024, has given weight to the value and meaning that India attaches to its ties with Russia.

The last annual summit between India and Russia took place in December 2021 when President Putin visited New Delhi. Since then, on account of the Ukraine war, no annual meet between the two leaders could take place. As such when Putin said, "We will be happy to see our friend Prime Minister Modi in Russia." it offered a glimpse of depth of the relationship between the two countries, which is sharply missing in India-US ties, despite having a defining partnership between the two countries.

Examples of this can be seen in the India and US civil nuclear agreement, which was signed on March 2, 2006. Due to America's insistence to go by its Convention on Supplementary Compensation for Nuclear Damage (CSC), which requires that all burdens imposed by any nuclear accident be channelled solely to nuclear plant operators, rather than to suppliers, all attempts for a healthy and beneficial nuclear partnership between the two countries have come to naught.

India, a victim of the deadly 1984 Bhopal gas leak tragedy in which thousands of people died and thousands of others suffered injuries, prevents any such deals that rescue suppliers from liability in the case of nuclear or chemical-related mishaps. In contrast, there are no such agreements in place with Russia and yet its civil nuclear cooperation with India is robust.

During Jaishankar's visit, the two countries signed an agreement for future units of the Kudankulam nuclear power projects. Russia has been offering technical assistance to build a nuclear power plant in Kudankulam in Tamil Nadu. Since February 2016, the first power unit of the Kudankulam nuclear plant has been operating smoothly at its designed capacity of 1,000 MW. Its full capacity operationalisation is expected to take place in 2027, as per Russian state media.

This is an example to show where India-Russia partnership stands in today's turbulent geopolitical situation. Unlike the US, Moscow, in fact, does not adopt double standards in its treatment with its friends or allies.

The Biden administration filed a chargesheet in a New York court naming an Indian official in a foiled plot to kill Gurpatwant Singh Pannun, a terrorist and the US citizen on American soil. But months have passed since the Indian consulate in San Francisco has been attacked, while threats to Indian diplomats, Indian parliament and Indian airlines are being continuously issued from the US soil, yet no action has been taken against culprits even as NIA has submitted documentary evidence against them to the American authorities. This is a clear reflection of the two sets of rules being followed by Americans. It has impacted India's trust and confidence in the US. This is the reason India is in favour of a multi-polar world with Russia as a strong nation and not a weakened one. Jaishankar's visit signalled it categorically.

–The writer is a senior journalist with wide experience in covering international affairs. The views expressed are of the writer and do not necessarily reflect the views of ***Raksha Anirveda***

During his visit EAM Jaishankar discussed plans on joint production of military equipment besides other issues of bilateral and global importance, with his Russian counterpart

ISRAEL DIARY

ARTIFICIAL INTELLIGENCE BASED COMBAT LOGISTIC SYSTEM TAKES CENTRE STAGE

The Israeli Defence Forces are implementing all the advanced technologies developed by the Israeli defence companies. Some have already proved their efficiency in combat during some clashes on the Gaza and Lebanon fronts

By **ARIE EGOZI**

The lessons from the Russian invasion of Ukraine will be in the centre of a huge number of research papers after this war ends. But one thing is clear- the Russians were confident that the invasion will achieve its goals in days and had not realised the results. Looking at the development of the war so far, it's clear evident that the Russian logistics were built to support some days of fighting. When the fighting prolonged, the logistic infrastructure proved to be faulty, outdated, and even ridiculous.

The logistics of the army determine whether a war is won or lost. The Russian invasion of Ukraine is the best and most recent example of a conflict that did not turn out as its initiators intended. The Israeli Defence Forces' (IDF) experts are currently studying the Russian logistical failure.

Lt Col (ret.) Eyal Ziz, commander of the logistic department of the IDF's 98th unit, conducted a study on the Russian logistic systems in Ukraine. In an article for the IDF's official magazine, he says that an army that is ready for prolonged combat must also be ready to feed its troops for longer than the anticipated length of the conflict.

"The Russians probably didn't anticipate that the fighting would last for weeks or months, and the Russians had a great reliance on logistical planning. In Western armies, it's customary to supply according to demand, whereas the logistics in the Russian army are built on supply according to advanced planning," the author writes.

According to the IDF logistic expert, instead of the strategy dictating the logistics in the campaign - the logistics dictated the strategy. The IDF officer points to another planning failure that apparently contributed to the poor organisation- the attempt to maintain the element of surprise.

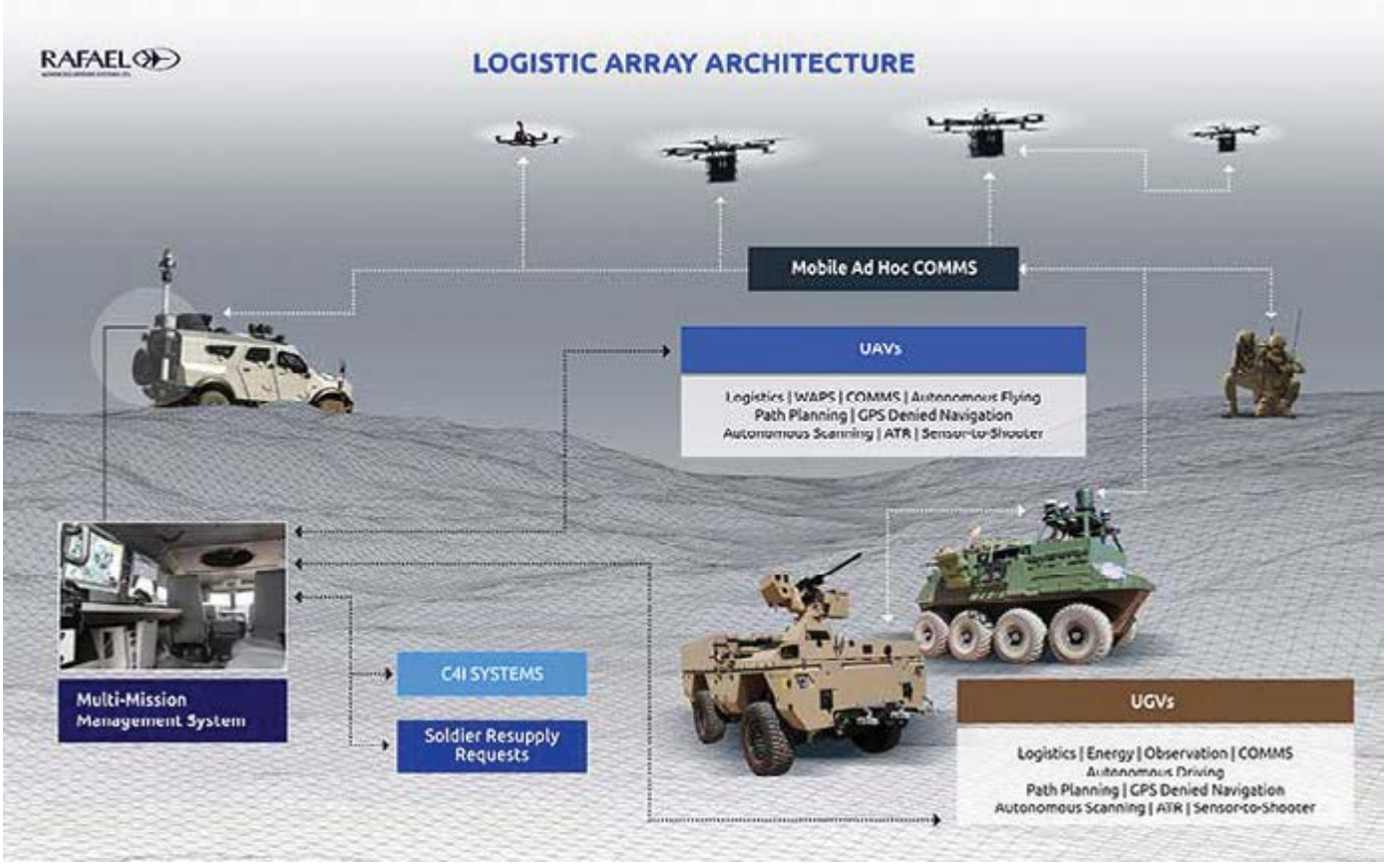
"The decision to hide the army's plans for invasion was aimed to generate disinformation, and confuse the enemy, but among those surprised were the Russian soldiers who were required to fight it."

The war Israel declared after the Hamas attack on villages in Southern Israel on October 7 again puts the focus on the importance on logistics' in the war zone. But even before this war, while the IDF was engaged in what has been nicknamed "the war between wars" in reference to the operations against Hezbollah in Lebanon and Hamas in Gaza, logistics got a high priority. Some years ago, the IDF put together a solid logistics plan in anticipation of a major confrontation. In the war that broke out last October, some of the lessons have been implemented and this is only the beginning of an ongoing effort.

As part of this effort, the IDF is employing technologies developed by numerous Israeli defence companies. The British Defence Ministry recently chose two of these technologies to showcase an advanced AI-based combat logistic system. The two, Israel Aerospace Industries (IAI) and Rafael, were chosen following a competition with the participation of 100 international companies. The two Israeli companies have proposed systems that are based on the combat experience of the Israeli Defence Forces (IDF). All the experts agree that the basic system offered, will in the future enable the centralised autonomous operation of unmanned systems on the ground and in the air for combat missions.

The Rafael's end-to-end system for planning and

The British Defence Ministry recently chose two of these technologies to showcase an advanced AI-based combat logistic system. The two, IAI and Rafael, were chosen following a competition with the participation of 100 international companies



ISRAEL DIARY

According to a senior Rafael source, the solution developed by the company, utilising the capability offered by autonomous platforms and supported by autonomous control system decision making allows to minimise the number of soldiers on the battlefield and to perform the logistical tasks more efficiently and more safely

managing logistic resupply for units deployed on the battlefield, was selected by the UK Ministry of Defence for the award of a contract for experimentation activity under Lot 1 of the Project THESEUS - a Joint Tactical Autonomous Resupply and Replenishment (JTARR). The end-to-end system is directed by a single operator mission control and management system. By employing fully autonomous UAVs and UGVs, the system provides a unique and groundbreaking solution to the challenge of battlefield logistic resupply.

With an added focus of minimising the number of forces in the combat arena through minimising the manpower requirement, the system relies on fully autonomous unmanned air and ground platforms. These components are managed and controlled by a master mission management system which is based on modern technologies including COMBAT AI, GPS-free navigation and advanced image processing. The logistics system, whose purpose is to perform delivery tasks to the tactical level draws and gathers information from a variety of existing battlefield sources (such as BMS and various command and information systems) as well as from commanders and units in the field. The system then analyses the information and uses it to generate meaningful logistic resupply tasks.

The primary mission control and management system can choose the most suitable and effective platforms for each assignment before planning the corresponding individual tasks thanks to AI algorithms. The work is simultaneously planned by the system from a systemic perspective. Each of the platforms carries out the mission autonomously, without the need to endanger human life. Additionally, the diversity of sophisticated algorithms that are already included in the system help it recognise and autonomously adjust to a variety of dangers and barriers that may appear on the battlefield, enhancing and guaranteeing mission success.

According to a senior Rafael source, the solution developed by the company, utilises the capability offered by autonomous platforms and supported by autonomous control system decision making allows to minimise the number of soldiers on the battlefield and to perform the logistical tasks more efficiently and more safely. Talking with the program managers in Rafael, the scope of the program and its potential for more than supplying ammo and food to front line units becomes clear.

Michal Vermouth, head of land autonomous systems unit in Rafael explains that the currently used logistic systems are complicated and slow. Our systems allows unmanned ground vehicles (UGV) and drones to perform the mission. She explained that the system's "brain" gets all the requests from the different units in the combat zones. Then it puts in the equation in all the different ways to bring the supplies, the best platform to perform the mission. "A drone can make the way to an isolated fighting unit in 90 seconds and fly back to be reloaded," she points out.

In certain circumstances, the mission will be revised after it is launched as more urgent resupply concerns are detected in a different combat unit, according to Golan B., marketing and business development director, ground systems unit of Rafael. According to the Rafael official, the program determines the urgent resupply demands and takes into account all other variables to optimise the delivery securely and quickly. "The system's brain is the AI engine we created in Rafael. It is the most sophisticated of its kind and is based on the business's extensive expertise employing AI in several of our cutting-edge weapon systems," he explains.

According to the Rafael officials, while other companies are focusing on the autonomous operation of a single vehicle, the effort in the Israeli company has been to enable such operation to a large number of different platforms that will work according to commands delivered by a centralised automatic operation centre. "The AI based system will lower the cognitive burden on the soldiers and enable them to concentrate on fighting while the logistic missions are performed by the system," Golan B. said. And while the focus is now on logistics, it is obvious that such an advanced AI based system is also capable of controlling the growing number of autonomous ground fighting vehicles, currently developed in the world including Israel.

The second system has been developed by Israel Aerospace Industries (IAI). A company official said that the system that was selected is a centralised "tasking" one that is using different unmanned systems for combat logistic missions. "We bring into the overall competition, our AI combat proven capabilities and our vast array of ground and aerial unmanned systems that will perform the logistic missions," Rani Avni, deputy GM land systems, head of robotics and autonomous systems directorate said. He added that the aim of the systems that was selected for evaluation by the British is to lower to a minimum that danger to the logistic teams. "Our system is based on a hub that receives the demands from the fighting units and then prioritise them according to the fast changing status of the fighting."

The IAI official added that the THESEUS concept is a perfect solution for what is dubbed "the last mile" logistic challenge – supplying what the front combat units need at all times under all combat conditions. Avni said that the concept is based on autonomous ground

vehicles. "The concept is creating big interest in many armed forces and some are already talking with us." The IAI official said that the war in Ukraine has put the logistic issue high on the wish list of many armed forces. Is the system immune against electronic warfare? Avni was not ready to go into details but only said that the problem "is addressed and we have answers".

IAI has not only developed an AI based logistic system but also the carrying platforms. One is the "Rex". The Israeli company is now offering the advanced version - the MK 2. According to IAI, Rex MK II is a multisession system providing direct support to maneuvering infantry units. It can perform a variety of tasks: tactical logistic support, tactical ISR, operating lethal weapons through target acquisition, evacuating wounded soldiers. The Rex includes "follow-me" driving mode adapted for infantry forces. The company says that the advanced Rex supports up to 1.25 ton of payload and is powered by an electric Hybrid systems. It can travel to ranges of up to 300 Km (70 km while going on electric power only). Operation mode include -Tele-Operation beyond LOS, "Follow-me" mode and fully automated. It can be easily transported by a MV-22 or CH-47F.

The other autonomous vehicle is the Jaguar, also developed by IAI in close cooperation with the technological department of the IDF ground forces command. According to the IDF, the Jaguar travels autonomously, detects and bypasses obstacles, avoids collisions and trampling, calculates a route for itself and detects its surroundings by dozens of sensitive sensors. It is currently stationed 24 hours a day as part of a smart border concept developed in the IDF's Gaza Division. The Jaguar is armed with a machine gun, controlled from the remote operation command post. According to the IDF, the plan is to add more weapon systems to the Jaguar to carry out various mission. The vehicle can also be used for combat logistic missiles.

The IAI official added that the THESEUS concept is a perfect solution for what is dubbed "the last mile" logistic challenge – supplying what the front combat units need at all times under all combat conditions. IAI has not only developed an AI based logistic system but also the carrying platforms - the "Rex" and the "Jaguar"

Avni said that vehicles like the Rex or the Jaguar are used when the cargo is heavy. "When a lighter cargo like transfusion blood is urgently needed, we offer delivery by a drone," he remarked.

The Israeli Defence Forces are implementing all the advanced technologies developed by the Israeli defence companies. Some have already proved their efficiency in combat during some clashes on the Gaza and Lebanon fronts. As the threats on Israel get more serious, the logistic issues get a much higher status in the IDF's priorities list and the autonomous vehicles and other platforms have become a more normal sight in different arenas.

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

SURVEILLANCE & RECONNAISSANCE IN FUTURE CBRN OPERATIONS

Timely information is necessary for optimal response to Chemical, Biological, Radiological and Nuclear (CBRN) weapons on a battlefield. For this, CBRN Surveillance and Reconnaissance gathers intelligence about such weapons and the contaminated area by performing critical tasks on the battlefield. Rapid identification is required to take tactical decisions and to protect soldiers against CBRN hazards. The use of robotic vehicles and detectors will be force multipliers in CBRN reconnaissance in the future

By **COL (DR) RAM ATHAVALE**

The ongoing wars in Ukraine and Israel have shown that future battlefields will be hybrid asymmetric and use many emerging technologies. Future battlefield is going to be complex, with myriad weapon systems being employed. The concern for loss of life has led to increased use of automated systems. Chemical, Biological, Radiological and Nuclear (CBRN) weapons are the most feared ones and hence getting accurate and timely information for optimal response is necessary. CBRN Surveillance and Reconnaissance is a specialised field of gathering intelligence about CBRN weapons. Timely inputs can help warn possible victims and enable them to take requisite precautions for saving lives. It also helps commanders in planning 'Fighting Dirty' missions in contaminated environments. Comprehensive surveillance, early detection and reconnaissance of CBRN incidents will be crucial for the safety of soldiers and first responders in future warfare.

PRINCIPLES

Reconnaissance is a mission undertaken to obtain information by visual observation, or other detection methods, about the activities and resources of an enemy, or about the meteorological, hydrographic, or geographic characteristics of a particular area. CBRN reconnaissance is a specific type of reconnaissance. The purpose of CBRN reconnaissance is the detection and identification of CBRN hazards. This includes finding gaps and detours around CBRN-contaminated areas. The operations can be further classified as under:

- CBRN Surveillance. CBRN surveillance is the systematic continuous observation of an area to provide early warning of likely contamination. Rapid assessment of changes in aerial content, soil deposits and surface contaminants is essential for real-time response.
- CBRN Reconnaissance. CBRN reconnaissance is a mission undertaken to obtain militarily significant information about the CBRN condition of routes, areas, and zones. This information confirms or denies the presence of CBRN attacks or hazards with detection and identification equipment. Visual observation or the collection of samples in the specified location or region can also provide this information.
- CBRN Survey. CBRN surveys are missions conducted to collect detailed information on CBRN contamination hazards. The survey determines the type of contamination, the degree (extent/intensity), and the boundaries.
- CBRN Sampling. Sampling operations provide physical evidence of CBRN attacks and technical intelligence concerning the enemy's CBRN weapons systems.

PURPOSE

The goal of CBRN reconnaissance is to produce actionable combat information to allow friendly forces to avoid contaminated areas. CBRN reconnaissance also can produce technical intelligence concerning the enemy's offensive CBRN capability. CBRN reconnaissance is part of the overall intelligence collection effort. It is performed in advance of other combat operations, as well as during them, to provide information used by the commander to confirm or modify his concept. CBRN reconnaissance is conducted throughout the framework of the battlefield from the forward combat area to deep in the theatre's rear area. In essence, it entails:

- To produce combat information to allow friendly forces to avoid contaminated areas.
- CBRN reconnaissance is part of the overall intelligence collection effort.
- It is performed in advance of, and during, other combat operations, to provide information to the commander to confirm or modify his concept of battle.
- CBRN reconnaissance is also conducted throughout the framework of the battlefield from the forward combat area to deep in the theatre's rear area.
- CBRN reconnaissance missions are conducted wherever the enemy has the capability of employing CBRN weapons.

FUNDAMENTALS

CBRN reconnaissance operations are planned and performed with six fundamentals in mind:

- Retain freedom of manoeuvre.
- Orient on the threat.
- Report all information rapidly and accurately.
- Develop the situation rapidly.
- Avoid contact with enemy forces.
- Maximize the capability of CBRN reconnaissance units.

Retain Freedom of Manoeuvre. By avoiding contaminated areas, the commander maintains freedom of manoeuvre. Knowing the location of contaminated areas allows all units to practice the first principle of CBRN defence - contamination avoidance. This limits the effects of degradation on soldiers operating at high MOPP levels.

Orient on the Threat. CBRN reconnaissance operations are limited to those areas where the enemy can employ CBRN weapons. The use of persistent chemical agents is the major threat that the majority of CBRN operations will be directed against. The intelligence preparation of the battlefield will identify where, when, how, and why the enemy will employ his CBRN weapons. It is impossible to conduct CBRN reconnaissance continuously at all points on the battlefield. This intelligence report assists in focusing the CBRN reconnaissance effort at the most critical places and times on the battlefield.

Report All Information Rapidly and Accurately. CBRN reconnaissance is performed to obtain information. Higher commanders need this information to confirm or make decisions. CBRN Surveillance along forward deployment and routes of the advance can aid in effective early warning to friendly troops and pre-emptive actions. Combat information loses value quickly. Negative reports tell as much as positive reports. Accurate and real-time reporting of locations is essential to avoiding CBRN hazards.

Develop the Situation Rapidly. Once contamination is encountered, the unit performing the mission must

Reconnaissance can be manned or unmanned. For unmanned reconnaissance, robotic means (both ground and aerial) can be used. Robotic Unmanned Ground Vehicles (UGVs) and Unmanned Aerial Vehicles (UAVs) are used when you cannot or do not want to send personnel in a contaminated environment

THOUGHT POT

CBRN Centres integrated with the respective HQs should have matching CBRN SADSS. Data inputs from field-deployed sensors, either from the AICBRNS or the RVs should be received in real-time via secure data networks at the SADSS

rapidly identify the type and intensity. The extent of the contaminated area and possible bypass routes or gaps must be quickly identified.

Avoid Contact with Enemy Forces. Detecting and identifying CBRN agents is extremely difficult on the battlefield. Many of the detection procedures are time-consuming. Contact with enemy forces has a degrading effect on CBRN reconnaissance operations. It is seldom possible to accurately detect and identify CBRN agents while in close combat.

Maximise the Capability of CBRN Reconnaissance Units. When selecting a CBRN reconnaissance unit to perform a task, the commander must consider various capabilities and limitations of the unit. Optimal use of technologies and remote networked sensors can aid the judicious employment of reconnaissance units. The mobility, survivability, and detection capabilities of each type of unit are considered when assigning tasks and missions.

CBRN RECONNAISSANCE OPERATIONS

CBRN reconnaissance operations support the CBRN principle of contamination avoidance. CBRN reconnaissance provides commanders with freedom of manoeuvre and minimizes the degradation from operating under CBRN conditions. The CBRN Reconnaissance teams (dismounted) and the CBRN Reconnaissance Vehicle (RV) have to be suitably equipped to perform all the tasks given below:

- Detection. Detection for timely warning of units - Identify if an event has occurred - Discover location - Find the device/source - Transmit warnings.
- Identification. Confirms other detection inputs. Supports protection level selection, preventive measures, and casualty treatment.
- Marking. Marking allows friendly forces to avoid the hazard – Mark point of contamination – hot spots, boundaries and safe zones/routes.
- Reporting. Allows resource status assessment and mission asset assignment - Hazard mapping - Confirmation by wide area survey.
- Sampling. Sampling aids the identification - Detect and identify the type of contamination. Also aids forensic confirmation to pinpoint the source.
- Casualty Management. Immediate First Aid.
- Immediate Decontamination. On-site immediate decontamination for critical onboard equipment.

CURRENT CONCEPT

The Army presently uses a combination of manual and sensor-aided CBRN reconnaissance procedures. Surveillance for possible CBRN strikes or incidents is not in vogue.

Nuclear. For Nuclear, there is the NBC Sentry, a trained soldier who, on inputs of a likely nuclear strike, stands and scans the skies with his instruments. On sighting a strike, he must record the time of burst, the height of the burst and flash-to-bang timing. All this in the few seconds that the immediate effects will last. (Notwithstanding the teaching that one must drop flat on the ground and face towards the direction of the blast.) These readings are then transmitted to the CBRN Centre via secure communication channels as the NBC 1 report to calculate the possible yield and work out the hazard template. Sensors with armoured vehicles and RVs also give more accurate readings of radiation and can reconnoitre the area after the blast effects to ascertain the radiation type, spread and hotspot(s), and feed the data for hazard mapping and prediction.

Chemical. Signs of early symptoms and/or signs of a chemical release would evoke a rapid response. The response will be in terms of MOPP levels and specialist teams reconnoitring the area with hand-held or RV-borne sensors to ascertain the spread and hotspot(s), and feed the data for hazard mapping and prediction.

Biological. Presently there are no field Bio reconnaissance procedures unless there is an indication of a disease spread. Samples can then be collected and sent for analysis. Bio agents (albeit quite lethal) have a manifestation period and do give some reaction time.

NEW CONCEPT

The new concept of CBRN surveillance and reconnaissance aims to use modern technology to obviate risk to humans and enhance real-time detection and response capability. Surveillance along manned (and unmanned stretches) defences and borders can be achieved by advanced integrated sensors deployed at select sites to give complete coverage and detection of possible releases or strikes. In addition, holding forces and Border Security agencies can be equipped with drones suitably integrated with CBR sensors for early detection of any suspected hostile releases and initiate protective protocols.

Reconnaissance can be Manned or Unmanned. For unmanned reconnaissance, robotic means (both ground and aerial) can be used. Robotic Unmanned Ground Vehicles (UGVs) and Unmanned Aerial Vehicles (UAVs) are used when you cannot or do not want to send personnel in a contaminated environment. Such robots are small, self-deployable and autonomous in function and can be fully managed and monitored

from the parent post or RV. Technology has enabled miniaturised UGVs and UAVs, which can carry payloads of CBR detectors for CBRN reconnaissance. The use of such vehicles will reduce the exposure of humans to contamination and increase the effectiveness and scope of the reconnaissance.

The Integrated Concept. The concept entails the carriage of two mini UGVs and one small UAV (quadcopter) fitted with CBR sensors/detectors and live secure video feed capability. The UGVs are integrated with the onboard Situation Awareness and Decision Support System (SADSS) on the CBRN RV and can transmit non-line-of-sight data feed of video and readings of the CBR detectors up to one-kilometre distance.

The CBRN RV moves on the battlefield along with the tactical force. Either on call or upon sensing contamination by onboard systems, the CBRN RV unleashes the UGVs and UAVs to get detailed info on contamination in the area surrounding the CBRN RV. These surrogates go into the contaminated zone and pass back information through secure non-line-of-sight data feed to the SADSS on the CBRN RV.

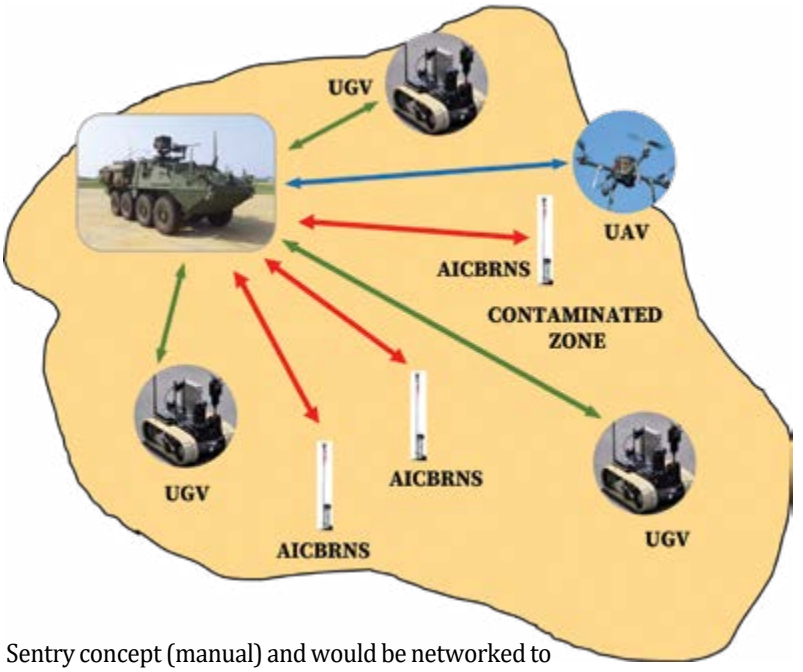
The mother vehicle crew can manoeuvre the surrogates to identify hotspots and into inaccessible areas. This allows reconnaissance of difficult contaminated areas where it may not be possible or advisable to send personnel. It also affords wider and better coverage of the contaminated areas in a shorter period. Based on the inputs of the surrogates, the CBRN RV moves in for sample collection and detailed analysis. All surrogates and onboard detection systems are integrated into the SADSS for near real-time response. Similar actions are undertaken by the other CBRN RVs in the unit and a complete area reconnaissance is conducted.

INTEGRATED CBRN RECONNAISSANCE CONCEPT

Based on the inputs and analysis provided by the CBRN RV and its surrogates, the Unit commander can take necessary tactical decisions for the continuation of operations. The CBRN reconnaissance unit can also identify suitable clean and secure areas for casualty management stations and for decontamination stations.

EQUIPMENT SPECIFICS AND FIELD DEPLOYMENT

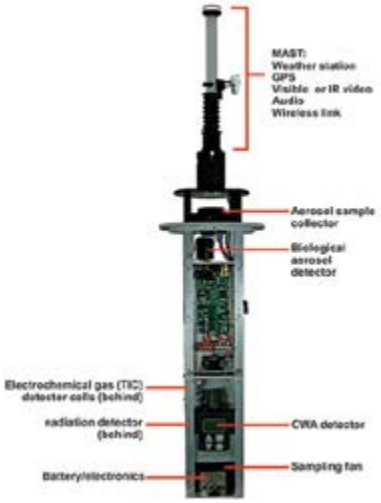
Automated Integrated CBRN Sentries (AICBRNS). The AICBRNS constitutes detection systems for Chemical, Biological, Radiological and Nuclear detection. The AICBRNS replaces the erstwhile NBC



Sentry concept (manual) and would be networked to the SADSS of CBRN Centres at Battalion HQ, Brigade and above. The AICBRNS integrates into a single unit:

- **CBR Sensors/Detectors.** Compact, lightweight and modular sensors, to detect and record agent parameters, (Agent identification, intensity, persistency, volatility, and hotspot locations). An operating range of 100m in battlefield conditions would be optimal. The detection would be point/proximity detection on occurrence/release.
- **Nuclear Blast Detector.** The AICBRNS device also has a 3600 infra-red camera (both in azimuth and elevation) suitably ruggedised, stabilised, filtered and integrated with sensors to detect nuclear explosion parameters (height of burst, flash to bang time, distance from observer and direction) and automatically work out the likely yield. Similar to the Bhang meter but much smaller, more accurate and more effective.
- **Met Sensor.** The AICBRNS also has a met sensor to compute the met data for transmission to the CBRN Centre.
- **Form Factor and Mounting.** Such integrated devices should be compact and lightweight, and can be mounted on a tripod mount, fixed on a vehicle (reconnaissance vehicle or Command vehicles), UGVs or even mounted on static structures/buildings. These devices can be integrated into the holding formation reconnaissance and support teams or with the forward line of defences. They can also be used on vehicles mounted with strike formations reconnaissance units and all engineer task forces. The AICBRNS should be compact enough to be a payload on UAVs and UGVs for

THOUGHT POT



Some European companies have made advances to develop integrated sensors. However, none include a nuclear blast parameter detector yet. Systems like Bhangmeters do exist for satellite recordings. It may be a good project for Indian companies to develop a truly viable AICBRNS under 'Make in India'

remote use on the battlefield (open terrain and in Built Up Areas [BUA]).

- **Networking.** All AICBRNS shall be networked via dedicated wireless secure data channels to the CBRN Sit Awareness and Decision Support System (SADSS) at the CBRN Centres and RVs.

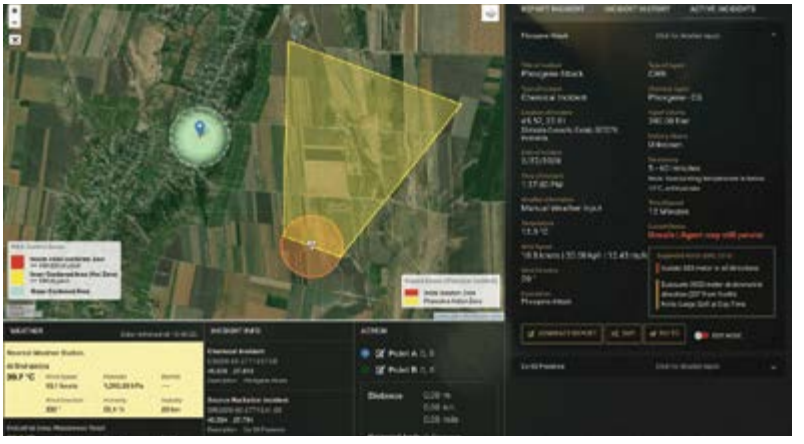
In a defensive layout as obtaining in hostile/sensitive borders, line of control and forward defences in occupied territories, a grid system of deployed sensors is required. These sensors or Automated Integrated CBRN Sentries (AICBRNS) should be deployed ahead of field defences, on bunkers and watch towers and on mobile reconnaissance platforms. The aim is to establish a comprehensive sensor network linking UAVs (or drones), and UGVs with the CBRN RV and CBRN Centres. The system will be interoperable with older surveillance technology to provide a recognised CBRN picture that should enable a common operational picture shared across all levels of command.

The AICBRNS should have a detection range of 100 metres radius, with some systems based at critical locations having a long-range detection capability (up to 5 km). It should be ensured that the detectors are advanced enough to be able to detect CBRN contamination over other battlefield interferents. They would also be networked with CBRN RV (tracked or wheeled). The AICBRNS would be in addition to the hand-held systems carried by dismounted reconnaissance teams.

CBRN Reconnaissance Vehicle (RV). The CBRN RV, which provides for a protected environment, should have matching mobility with other mechanised forces. It should have limited floatation capability to undertake reconnaissance across water bodies (canals, lakes, rivers). The CBRN RV should have the following equipment integrated on board:

- Detection and Identification Equipment for CBRN detection. The RV can have a vehicle-based version of the AICBRNS in addition to other sensors to build redundancy. Duplication of detection equipment (space permitting) can help rule out false alarms and help in confirmation of contamination. Hand-held detectors should also be provided for manned dismounted reconnaissance. Suitable analysis equipment must be integrated onboard.
- Sampling Equipment. This should cater for both surface/soil sampling for liquids and powders and air sampling for aerosols, gasses, and vapours. Sampling should be remotely controlled to avoid exposure of the crew to outside contamination.
- Situational Assessment and Decision Support System (SADSS). The CBRN SADSS should include Hazard mapping and prediction, automated report generation and warning, and mission planning for fighting dirty. Data inputs from field-deployed sensors like the AICBRNS, UAVs and UGVs should be received in real-time via secure data networks at the SADSS on the RV.
- Met/weather station. Integrated to aid hazard prediction.
- Personal protection equipment for the crew for dismounted tasks.
- Marking equipment in the form of spikes, pickets, or buoys.
- Immediate Decontamination equipment like advanced quick-apply powders, foams or gels (PDAs and PDKs).
- First Aid kits and casualty bags for immediate casualty management.
- Secure a dedicated CBRN communication network.

CBRN Centre. CBRN Centres integrated with the respective HQs should have matching CBRN SADSS. Data inputs from field-deployed sensors, either from the AICBRNS or the RVs should be received in real-time via secure data networks at the SADSS. The SADSS at the HQs should include an additional administrative package catering to logistic issues such as stocking status, shelf-life calculators, inventory management, demand and disposal data and sizing rolls. The SADSS would be integrated into a co-opted Met sensor or weather sensor.



INDIAN INDUSTRY

AICBRNS. There are some advances made by some European companies to develop integrated sensors. However, none include a nuclear blast parameter detector yet. Systems like Bhangmeters do exist for satellite recordings. It may be a good project for Indian companies to develop a truly viable AICBRNS under 'Make in India'. There could be two versions, a basic one without the Nuclear blast detector unit and another advanced version with it.

CBRN RV, UGVs and UAVs. CBRN RVs exist in many countries and work is on to improve their capabilities. Many companies have also developed CBRN UAVs and UGVs. However, system integration of these as surrogates to the RV has not yet been achieved. The Indian CBRN RV based on the BMP 2 is passe. We need to look for a better integrated ICV platform for the CBRN RV while integrating the AICBRNS and the UGV and UAV surrogates, all controlled by a rugged CBRN SADSS. A lot of Indian companies are already producing reliable UAVs of various types. Some can be used for integrating the AICBRNS when developed. Some companies are also developing UGVs in India. An effort is needed from the Government (MoD and MHA) to assist in such development.

CBRN SADSS. Some Indian companies are already working on a SADSS. There is a need to standardise the system and keep it compatible with future digital platforms for seamless integration.

CONCLUSION

CBRN surveillance and reconnaissance entails five critical tasks on the battlefield — detect, identify, mark, report, and sample. Early detection of CBRN hazards is required for timely warning of units and personnel in affected areas. Detection of contamination is the cornerstone of contamination avoidance. Rapid identification is needed to adequately protect soldiers against CBRN hazards. The use of robotic vehicles and detectors will be force multipliers in CBRN reconnaissance. Optimal use of such technologies will enhance operational effectiveness and aid in saving lives.

–The writer is a veteran Army officer. A renowned expert, he has been a key CBRN Advisor to Government of India and the EU CBRN CoE. He has authored a pioneering book titled "Toxic Portents" on 'CBRN Incident Management in India'. Presently, he is a freelance CBRN Security and Risk Mitigation Professor and Consultant based at Pune, India. His personal website https://chebiran.com has more details.

MUSINGS FROM RUSSIA

INDIA-RUSSIA DEFENCE PARTNERSHIP IS UNPARALLELED

The Indo-Russian bilateral ties, of which defence sector is a key component, have withstood the test of time, and they are expected to continue unabated in the near future, too

By **VINAY SHUKLA**

Despite the widespread media narrative of Russia's military decline, which now is in the third year of a proxy-war with the US-led Nato and collective West in battleground Ukraine, India is firmly sticking to its traditional policy of strategic and privileged partnership with Moscow including in defence as it remains the only source of some crucial military technologies, which none of its new friends would ever provide.

External Affairs Minister Dr. Subrahmanyam Jaishankar's Russia visit at the fag end of 2023 and his meetings with its top leadership have signalled that India and Russia remain committed to carry forward their all round interaction including defence cooperation. This comes at a time of geopolitical flux caused by the Ukraine crisis, virtually a US-led Nato's proxy war against Russia and Israel-Hamas conflict in Gaza, escalating into yet another West Asian war with the involvement of multiple states and non-state actors.

Despite the widespread media narrative of Russia's military decline, India is firmly sticking to its traditional policy of strategic and privileged partnership with Moscow

"We discussed prospects for military-technical cooperation, including joint production of modern weapons. Our interaction was strategic in this respect. Strengthening this cooperation meets the national interests of our nations and helps maintain security in Eurasia. We have respect for our Indian colleagues' efforts to diversify ties in military-technical cooperation. We also understand and are willing to support their initiative to manufacture combat hardware under the 'Make in India' programme. We are ready to interact with them in this respect." Russian Foreign Minister Sergei Lavrov declared after his talks with Jaishankar.

Some concrete proposals and projects were also discussed during Jayshankar's talks with the Russian Deputy Prime Minister Denis Manturov, who is co-chair of Indo-Russian Intergovernmental Commission and looks after the Industry and Trade Ministry, particularly responsible for the country's military industrial complex. The two sides are discussing defence joint ventures by investing Russia's multi-billion dollar funds stuck in India due to the US sanctions against Moscow, sources say.

"Subramaniam Jaishankar managed to do a lot, it was as if he was making up for what he had not managed to do in recent months. Despite the super-tight schedule of the visit, everything came together in an amazing way and did not require the expenditure of nerve cells and conversation in a raised voice, as happened in other capitals, which he had with other interlocutors." Sergei Strokan, a leading South Asia expert and columnist of Kommersant daily said commenting on outcome of the visit.

BrahMos JV is identified as the role model of successful defence production cooperation involving transfer of cutting edge cruise missile technology transfer which fully fits into the policy of defence Aatmanirbharta adopted by the Modi government. Production of crucial spares and force-multipliers in India by Russian OEM are also on the cards. This is inspite of the bitter experience of the past when intergovernmental agreements (FGFA, MTA) were scrapped over various differences over technology sharing, slippage in development schedule, indigenisation requirements etc. The two sides are also considering enacting a robust framework, Jaishankar mentioned mutual investments protection treaty as one such step. Russian OEMs, mostly government owned, are wary of entering in partnership with private sector companies and want Indian government guarantees to buy equipment from them.

Some officials in the know of the situation, speaking on the conditions of anonymity, said that there were hiccups in executing some orders for India, which could not be executed due to the problems in payment caused by the US Congressional CATSA (Countering Adversaries Through Sanctions Act) signed by the former US president Donald Trump.

According to media reports, on the eve of Jaishankar's visit India granted two more Russian banks the licence for FDI in the local stock market which most probably will be used also for setting up

defence related production.

"In a striking move signalling a shift in global trade dynamics, India and Russia have once again boldly sidestepped the US dollar, conducting an impressive $40 billion worth of trade using their local currencies." Dubai-based Cryptopolitan financial website claimed in an article.

Both strategic partners want to insulate their bilateral relations from the sanctions of the collective West. During his meeting at Kremlin with Jaishankar, President Vladimir Putin assured him of Moscow's continued support for India's self-reliance efforts in defence, despite whatever may be the outcome of the general elections in India, because of the national consensus on bilateral ties in both countries.

After initial setbacks caused by indirect Nato intervention in Ukraine, the Russian military-industrial complex due to Western sanctions appears to have successfully produced a substantial quantity of critical weapon systems.

In 2023, the second year of Ukraine standoff, Russian Armed Forces received a massive influx of military assets, including more than 1,500 tanks and 22,000 drones, the Russian Defence Ministry said in its end-of-year papers. The disclosed papers indicate a sufficiency level of over 84%, comprising over 1,500 tanks, over 2,200 armoured combat vehicles, more than 1,400 rocket and artillery vehicles, and over 22,000 unmanned aerial vehicles.

On September 19, Russian President Vladimir Putin addressing the meeting of Russia's Military-Industrial Commission in Izhevsk announced a significant increase in the production of battle tanks and armoured vehicles, noting a doubling of output from January to August 2023 compared to the same period in 2022. He highlighted that the production of some highly sought-after weapon systems had tripled during this timeframe. Putin's statements confirmed the western expert evaluations suggesting a substantial surge in Russian arms manufacturing that exceeded pre-2022 levels.

According to some reports Russia is currently on track to produce over two million artillery shells annually, doubling the average production rate before the Special Military Operation (SMO) in Ukraine.

Amid reports of Russia being at the receiving end of the top-notch Nato-origin hardware given to Ukraine, the widely publicised counteroffensive failed to take off last summer, pushing Ukrainian army back to dig into a new line of defence along the 1,000 km long front.

"The technological superiority of the West in the military sphere is a myth." a top Putin ally and CEO of Rostec Corporation, Sergey Chemezov said in his year-end interview to RIA Novosti agency.

"Yes of course, we have a lot to learn from them. We carefully study captured samples and take note of some decisions. At the same time, we see that the so-called technological superiority of the West in the military sphere is a myth. Yes, they are strong in some ways. But we are also not weaklings. Look at how many Leopards, Challengers, Bradleys and other Western equipment are rusting on the battlefields. This is the best confirmation of our capabilities. I will also add that Russia and the West have different design schools. Different approaches and concepts from the point of view of the development of certain types of weapons and equipment. Not all of their features suit us. And vice versa. The most important thing here is that the Russian army is fighting with modern, reliable and very dangerous equipment against the enemy." Chemezov further said.

Coming back to Indo-Russian defence cooperation, it would be appropriate to recall former president Pranab Mukherji's words as a defence minister, while on a visit to Moscow: "India-Russia cooperation in the field of defence is like an iceberg. You see only its tip but three-fourth of it is not visible."

*–The writer is a Moscow-based independent analyst. The views expressed are of the writer and do not necessarily reflect the views of **Raksha Anirveda***

BrahMos JV is identified as the role model of successful defence production coope-ration, fitting into the policy of defence Aatma-nirbharta adopted by the Modi government

VIEWPOINT

BITING THE SILVER BULLET: IS STOPPING POWER THE SAME AS LETHALITY?

The lethality of a weapon is based on the way it is designed and how they can be used. Taking note of several different parameters, the article details the lethality of some of the popular weapons. Ammunition industry expert, Managing Director of Hughes Precision **SANJAY SONI** explains

Samuel Walker and fifteen other Texas Rangers rode into the countryside to confront Comanches in June of 1844. About a week into Walker's expedition, dozens of Comanche horsemen appeared behind the Rangers, armed and shouting taunts in Spanish. More were almost certainly hidden nearby.

That day, the Rangers carried rifles - their usual weapons. But each man also wore a pair of Colt Paterson revolvers, new and mostly untested. Still, the guns were small and inaccurate, and so the Texans reached for their rifles first. The Comanches rode back and forth, goading them into taking shots. As the Rangers used up their ammunition, more Comanches emerged—sixty or seventy all told.

Eventually, the Rangers ran out of bullets, and the Comanches closed in. As the riders rushed across the prairie, the Rangers drew their pistols. The men fired a volley—and then, without pause, another and another. Comanches tumbled from their saddles. The Rangers "had a shot for every finger on the hand," a surviving Comanche recalled. The Native Americans fled, and the Rangers followed; by the end of the day, sixteen Rangers had killed twenty Comanches and wounded thirty more, dealing most of the damage with their Colts.

In this confrontation, the pistol turned out to be more lethal than a rifle! It is not only the capability of the gun to cause death that is the issue; it's also the capability of the bullet fired by

the gun. And since different guns fire different types of bullets, and every different bullet creates a different amount of damage, we can measure gun risk by combining the type of bullet delivered by a particular gun, plus how the gun is designed to deliver that particular bullet.

We will look into the lethality of various weapons using several different parameters.

Lethality is defined as how capable something is of causing death. Every gun is lethal, the access to any gun creates risk, but some guns cause greater risk than others, based on how they are designed and how they can be used

HANDGUNS

Handgun lethality can be defined with five criteria.

- **Caliber.** The caliber of ammunition determines the size of the bullet and the speed at which the bullet moves from the gun to its target. The larger the projectile and faster its speed, the more damage it will inflict.

For purposes of comparison, we do not include the following variables:

- Bullet Design. This varies based on the materials used in the bullet (soft versus hard metals) and the external shape of the bullet (round nose, flat tip, hollow point, etc.).
- Distance from Gun to Target. As a bullet travels from the barrel, it loses speed. For purposes of comparison we compare bullet speed at point of exit from the barrel.
- Environment. Bullets may travel faster or slower depending on climate, wind and other external factors.

SCORING CRITERIA: *The faster and larger the bullet, the higher the score.*

- **Capacity.** Here we measure the number of cartridges that can be fired from a weapon without reloading, based on the manufacturer's specifications. However, we do not measure capacity modifications based on the owner's ability to modify the weapon either through mechanical means or the use of non-standard loading devices.

SCORING CRITERIA: *The greater the capacity, the higher the score.*

- **Size.** We are assuming that as the shooter gets close to the target, the chances of a lethal hit will increase due to the proximity between the weapon and target. A shorter weapon can be concealed easily, increasing the chances of moving it closer to the target before shooting.

SCORING CRITERIA: *The shorter the overall length, the higher the score.*

- **Flexibility.** Certain design features make it easier or faster to deploy and discharge a weapon. These features include trigger mode (single action or double action), magazine release location (pistols, semi-auto rifles), and cylinder release location (revolvers).

SCORING CRITERIA: *Better flexibility of design features increases the chances of a score.*

- **Target Acquisition.** Increasingly, manufacturers are making it easier for gun owners to quickly acquire their intended target by equipping weapons with either integral laser devices or mounts that hold such devices. A laser device enhances both the quality and speed of performance because the gun operator can immediately see where the gun is pointing without having to use the sights.

SCORING CRITERIA: *Integral or mounted lasers improve the chances of score.*

MEASURING THE LETHALITY OF HANDGUNS

S & W Model 351PD
Lethality Score: 22

S&W Model 637
Lethality Score: 18

These two revolvers are exactly the same size, approximately 6 inches in length. They are designed to be highly concealable guns. They both hold 5 rounds of ammunition and they both shoot in double-action mode, which means that the trigger does not have to be cocked prior to firing the gun.

However, the Model 351PD is chambered in 357 magnum caliber, and the Model 637 is chambered in 38 caliber. The lethality scores of these two guns reflect the one difference in lethality measurement, namely, that the

VIEWPOINT

ammunition used by the 351PD is 30% more powerful than the ammunition loaded in the Model 637.

We arrive at the lethality scores as follows:

Criteria	351PD	637
Caliber	9	5
Capacity	2	2
Length	7	7
Flexibility	4	4
Lethality Score	22	18

The manufacturer of these guns, Smith & Wesson, also offers them with an integral laser built into a gun grip. The 351PD with the laser grip would register a total lethality score of 25 and the 637 would register a score of 21.

We will now apply similar criteria to measure lethality of two small pistols:

S & W BG380
Lethality Score: 17

S & W SHIELD
Lethality Score: 20

Both pistols are highly-concealable, but the SHIELD is slightly longer than the BGA380. Both guns fire DA-SA, meaning the first trigger pull is longer (thus harder) than subsequent pulls.

The BGA380 pistol holds 6 rounds in the magazine plus 1 in the chamber, the capacity of the SHIELD is 7 + 1; the SHIELD holds 9mm or 40 S & W ammunition, the BGA380 is chambered 380acp, a less-powerful round.

Both guns have side magazine release buttons, which reduces the time required to drop empty magazines and reload.

We arrive at a lethality score as follows:

Criteria	BG380	SHIELD
Caliber	4	6
Capacity	4	6
Length	7	6
Flexibility	2	2
Lethality Score	17	20

Both guns are also offered with integral lasers. Even though the BG380 is chambered in a less-powerful caliber, it would achieve a lethality score of 20 if we were measuring the laser model. This would make the BG380 with a laser as lethal as the SHIELD without a laser; the aiming device in the BG380 compensating for the less-powerful ammunition.

NOW LET'S COMPARE TWO FULL-SIZE HANDGUNS

The Smith & Wesson M&P 40, which is a standard duty weapon carried by law enforcement and the Smith & Wesson Model 41, which is a highly-accurate target pistol used in competitive shooting matches and exhibitions.

Neither of these were designed to be concealed. The M&P 40 is a standard police weapon and police on patrol carry their weapons in open view. The Model 41 could only be concealed with great difficulty because of its barrel length, which is designed to make the gun more accurate. The length between front and rear sights makes it easier for the operator to focus the sights while also retaining a clear picture of the downrange target.

S&W Model M&P 40
Lethality Score: 25

S&W Model 41
Lethality Score: 11

The S&W M&P has a side magazine release lever. The magazine release lever on the Model 41 is at the bottom of the grip, requiring more time to release and load a new magazine. The police gun is double-action whereas the target gun is single-action which gives it a crisper and therefore more accurate shooting result.

We arrive at the lethality scores as follows:

Criteria	M&P	41
Caliber	7	2
Capacity	9	7
Length	5	0
Flexibility	4	2
Lethality Score	25	11

Note that the lethality score for the M&P 40 is the highest of any gun measured so far. Even though it is larger than either the 351PD or the SHIELD, hence less concealable, it also carries a much greater amount of ammunition. The SHIELD is also sold in the 40 S&W caliber, and had we rated that gun instead of the gun chambered in 9mm, the lethality score would have increased to 21.

On the other hand, since the 40 S&W caliber is more powerful than the 9mm, the 40 S&W gun would also have greater recoil, given the gun's small size and weight, which would reduce effectiveness in terms of target acquisition for multiple shots. Had we evaluated the M&P in its 9mm loading, the lethality score would have been reduced to 24, but since the M&P is a heavier, full-size gun, the issue of felt recoil is less evident; hence, police officers mostly carry the gun with the more powerful 40 S&W caliber.

Note that the Model 41 registered a low lethality score by far. In fact, its score is the lowest of any gun manufactured by Smith & Wesson. This is because of all the guns evaluated, the Model 41 is the only gun that was not designed for lethal (i.e., self-defense) use at all. It was designed as a true 'sporting' gun, to be operated in environments that test only the accuracy and skill of the shooter, not his intent to utilize the firearm in a non-sporting manner.

RIFLES

Rifle lethality can be defined on five criteria.

- **Caliber.** The caliber of ammunition determines the size of the bullet and the speed at which the bullet moves from the gun to its target. The size of the projectile and its speed will determine the amount of damage to human tissue.

For purposes of comparison, we do not include the following variables:

- Bullet Design. This varies based on the materials used in the bullet (soft versus hard metals) and the external shape of the bullet (round nose, flat tip, hollow point, etc.)
- Distance from Gun to Target. As a bullet travels from the barrel, it loses speed. For purposes of comparison we compare bullet speed at point of exit from the barrel.
- Environment. Bullets may travel faster or slower depending on climate, wind and other external factors.

SCORING CRITERIA: *The faster and larger the bullet, the higher the score.*

- **Capacity.** The number of cartridges that can be fired from a weapon without reloading, based on the manufacturer's specifications. We do not measure capacity modifications based on the owner's ability to modify the weapon either through mechanical means or the use of non-standard loading devices.

SCORING CRITERIA: *Greater capacity produces a higher score.*

- **Loading Mechanism.** This measurement captures the speed at which a rifle can be reloaded.

For purposes of comparison, we do not measure devices that can be used to increase reloading speed, unless the device is integral to the design of the rifle. Many magazine-fed rifles can be fitted with devices that hold additional magazines, but we do not measure such devices.

SCORING CRITERIA: *Faster reloading time leads to a higher score.*

- **Action.** The time required to fire a single cartridge and bring the next cartridge into the breech. There is a significant lethality difference between handguns and rifles since handguns (pistols and revolvers) do not require the manipulation of any mechanical part of the gun beyond pulling the trigger, in order to load the next round.

SCORING CRITERIA: *Lesser time to work the action leads to a higher score.*

- Design Flexibility. Since rifles have much longer stocks and barrels than handguns, they can be outfitted with a wider range of accessory items, some of which increase lethality, e.g., lasers, lights, electronic aiming devices, hand grips, fore grips, etc.

SCORING CRITERIA: *More rails and mounts lead to a higher score.*

MEASURING THE LETHALITY OF RIFLES

Let's measure the lethality of two rifles, an AR-15 and a Browning BAR. The AR-15 shoots a military round known as the .223 or 5x56. The latter weapon is a true hunting rifle, and is chambered in various calibers used for medium and large game.

The AR was designed as a military weapon and is currently carried by troops both in semi-automatic and full-automatic modes. In this comparison, the BAR is chambered for 7mm Remington Magnum, a standard load for medium and large game. Here are the lethality scores for both guns.

VIEWPOINT

AR-15
Lethality Score: 19

Browning BAR
Lethality Score: 15

Criteria	AR-15	BAR
Caliber	4	8
Capacity	5	1
Loading Mech.	3	2
Action	4	4
Design	3	0
Lethality Score	19	15

Note that the AR-15's lethality is scored higher than the BAR, even though the caliber of the BAR is twice as lethal as the caliber of the AR-15. The reason for this disparity, of course, is due not only to the greater capacity of the AR-15 feeding device, but the greater speed with which additional feeding devices can be inserted into the AR-15, along with the design flexibility which creates opportunities for increasing lethality through the use of lasers, aiming devices, etc.

SHOTGUNS

Shotgun lethality can be defined on five criteria.

- **Caliber.** The caliber (gauge) of ammunition determines the number and size of pellets and the speed at which the pellets move from the gun to its target. The number of pellets, their size and speed will determine the potential to cause damage.

For purposes of comparison, we do not include Barrel Choke. This will determine the spread of the pellets as they move away from the barrel.

SCORING CRITERIA: *The lower the gauge number, the higher the score.*

- **Capacity.** The number of cartridges that can be fired from a weapon without reloading, based on the manufacturer's specifications.

We do not measure capacity modifications based on the owner's ability to modify the weapon either through mechanical means or the use of non-standard loading devices.

SCORING CRITERIA: *More capacity means higher score.*

- **Shell Load.** The size of the shotshell; i.e., standard, magnum or super-magnum which determines both the number of pellets and the strength of the charge.

SCORING CRITERIA: *Larger shell means higher score.*

- **Action.** How the gun feeds ammunition into the breech. Shotguns use either a pump, semi-automatic or manual feeding procedure.

SCORING CRITERIA: Faster loading procedure means higher score.

- **Design Flexibility**. The capability to add accessories such as lasers or other aiming devices, as well as provision for pistol grips or thumb holes for greater stability.

SCORING CRITERIA: *Greater flexibility means higher score.*

MEASURING THE LETHALITY OF SHOTGUNS

Let's measure the lethality of two shotguns, in this case the Beretta 690 Field shotgun and the Mark I Tactical Shotgun from FN. The Beretta Field gun is one of the most popular over-and-under shotguns ever manufactured, found both in the field as well as on trap and skeet ranges. The FN gun was designed to support tactical missions, law of enforcement and military units,

Beretta 690 Field
Lethality Score: 12

FN Mark I
Lethality Score: 23

Criteria	690	MK I
Caliber	6	6
Capacity	1	3
Loading Mech.	4	7
Action	1	3
Design	0	4
Lethality Score	12	23

Although both guns are chambered for the same caliber – 12 gauge – the capabilities of the two guns to deliver lethal force ends at that point. The Beretta is a field and competition gun, with a premium on the shooter's ability to deliver a minimum number of shots in a very accurate pattern, primarily for use in overhead birds, or trap and skeet, the latter basically replicating much of the same requirements as taking birds but without live targets. The FN gun, with its much shorter barrel and higher capacity, is designed for flexible use in situations where mobility and quick response is much more important than downrange aim. What these scores cannot convey is the degree to which the lethality of any gun is dependent not only on the design and mechanics of the weapon itself, but the decisions that shooters make as to when and how they are going to use any particular gun.

A small revolver like the Smith & Wesson 351PD receives a lethality score of 22, whereas an AR-15 rifle receives a lethality score of just 19. Yet one could argue that an AR-15 is much more lethal than a 5-shot revolver because the rifle's capacity plus the ease of reloading means that it can be used to injure scores of people in the same time that the 351PD revolver might only injure a handful of folks.

But the fact that the 351PD and many of the other handguns scored higher than the Civilian version AR-15 on the lethality scale still validates the relative measurements of both guns because in the totality of gun violence, many more people are injured and killed with ammunition shot from small handguns than with the bullets that are shot from AR-15s. Civilian AR-15s differ from military versions because, in 1986, the Firearm Owners Protection Act banned the transfer or possession of machine guns.

As a result, a mechanical block on civilian ARs requires the shooter to pull the trigger to release another bullet. But clever gun enthusiasts have figured out an easy way to bypass this mechanism: a device known as a bump stock uses the energy of the rifle's recoil to assist in bumping the trigger against the shooter's finger. The original military version of the AR-15 can fire eight hundred rounds per minute; an unmodified civilian AR-15 might fire forty-five to sixty. A version with a bump stock can fire somewhere between four hundred and eight hundred.

In the 2017 Las Vegas shooting, a sixty-four-year-old man without advanced marksmanship skills or military training used a bump stock to achieve something like fully automated rifle fire, sending more than eleven hundred rounds into a crowd in the course of ten minutes, killing fifty-eight people and wounding more than five hundred. The modified AR-15 with the bump stock is far more lethal than any handgun.

-The writer is Managing Director, Hughes Precision Manufacturing Pvt. Ltd. The views expressed are of the writer and do not necessarily reflect the views of ***Raksha Anirveda***

INSIGHT

DEEP BLUE STRATEGIES

In the vast expanse of maritime security, Underwater Domain Awareness acquires crucial importance. India, positioned as a formidable naval power in the Indian Ocean Region, charts an innovative course to protect its underwater interests. This strategic initiative, spearheaded by the Indian Navy, encompasses cutting-edge sonar systems, advanced maritime surveillance networks, anti-submarine warfare capabilities, and collaborative international efforts

By **COMMANDER SUMIT GHOSH**

Underwater Domain Awareness (UDA) is dedicated to monitoring areas beneath the sea surface, encompassing Sea Lines of Communication (SLOC), coastal waters, creek regions, and diverse maritime assets with a focus on security considerations. This includes addressing hostile intent and the proliferation of submarine and mine capabilities designed to restrict access to seas and littoral waters. However, UDA extends beyond military requirements; it also encompasses the continuous monitoring of undersea geophysical activities and changes crucial to supporting human life on Earth. This vigilance aids in providing crucial insights into imminent natural disasters such as tsunamis, earthquakes, fluctuations in undersea flora and fauna, etc., thereby minimising the impact of such disasters. Additionally, undersea commercial activities require precise information on resource availability for exploitation, optimising economic gains. Regulators, in turn, need insights into exploitation patterns to formulate sustainable plans.

KEY COMPONENTS OF UDA

Maritime Surveillance Networks: Integrated systems of sensors, including radars, sonars, ESM AIS, lighthouses chains, and other communication and surveillance equipment working in tandem generate a comprehensive maritime picture. Such a network facilitates real-time monitoring and data fusion.

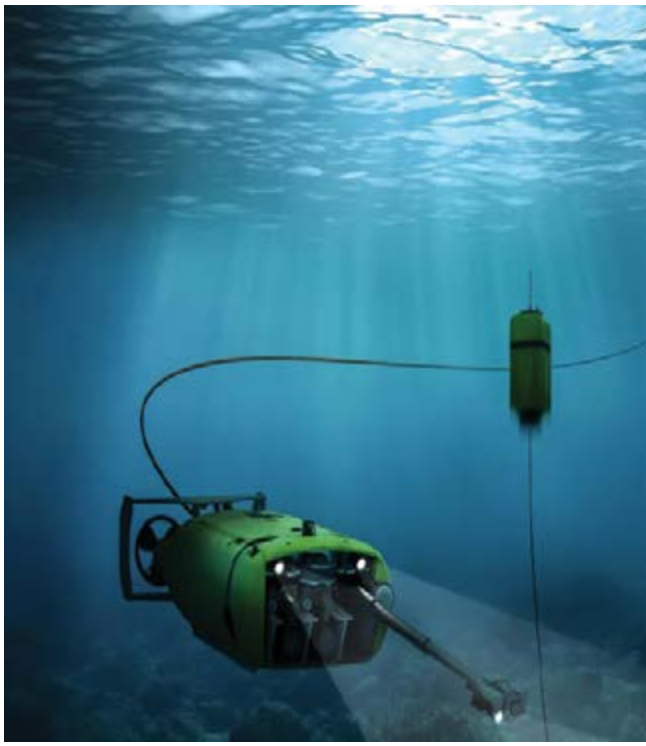
Secure Communication Infrastructure: Reliable and secure communication systems are essential for transmitting information between submarine platforms, surface vessels, aircraft, helicopters, shore stations, and other assets involved in UDA.

Sonar Systems: Advanced sound navigation and ranging (sonar) technology, including active and passive sonar systems, sonobuoys, towed arrays, and LF/ELF systems, helps in detecting and tracking underwater objects such as submarines, Unmanned / Autonomous Underwater Vehicles (UUVs/AUVs), and other underwater vehicles.

BROAD ARCHITECTURE OF UDA

Anti-Submarine Warfare (ASW) Capabilities: Specialized equipment and platforms tailored for anti-submarine warfare, including ASW aircraft, helicopters, ships, stand-alone sonar systems, and shore defences, play a vital role in UDA by actively countering potential underwater threats.

Satellite Systems: An independent satellite network ensures enhanced reliability during crises,



while indigenous satellite technology supports wide-area surveillance, communication, and navigation. This augmentation contributes to an overall heightened situational awareness in the maritime domain/area of interest.

Underwater Sensors: The deployment of underwater sensors, such as hydrophones, moored/unmoored buoys, and seabed sensors, assists in monitoring underwater activities and detecting anomalies.

AUVs and Remotely Operated Vehicles (ROVs): Unmanned systems like AUVs and ROVs are extensively utilized for underwater explorations, surveillance, and data collection in areas that pose challenges for manned operations.

Information Fusion, Analysis, and Representation: Robust systems for collecting, processing, and analysing data from various sources are crucial for making sense of complex maritime environments and aiding decision-making. This necessitates a network of interconnected computers and proficient software tools to quickly decipher the right information. The use of AI is an emerging concept in this domain.

Regional, National, and International Cooperation: Collaborative efforts, information sharing, and joint exercises at all levels, both nationally and with other maritime nations, contribute to a more comprehensive and coordinated approach to Underwater Domain Awareness (UDA). This is particularly crucial in regions with shared maritime interests, such as the Indian Ocean Region (IOR).

Legal and Policy Frameworks: Clear and well-promulgated legal and policy frameworks are essential to govern UDA activities, ensuring compliance with international laws while protecting national interests.

Research and Development: Continuous investment in research and development is paramount to staying abreast of technological advancements and innovating in UDA capabilities.

Integration of these components provides a synergistic and credible approach to UDA, enabling a nation to monitor and secure its maritime interests effectively.

THREATS TO UDA

Stealth Technology in Submarines and Submersibles: Advancements in stealth technology for submarines or submersibles can make them more difficult to detect using traditional sonar systems, thereby reducing the effectiveness of UDA.

Challenges in Underwater Communication: Underwater communication faces limitations due to signal attenuation in water. It is also dependent on various variables, including the depth and size of the transmitter, salinity, time of day, and ambient noise conditions. These factors can impede real-time data transfer and coordination among UDA assets.

UDA extends beyond military requirements; it also encompasses the continuous monitoring of undersea geophysical activities and changes crucial to supporting human life on Earth. This vigilance aids in providing crucial insights into imminent natural disasters such as tsunamis, earthquakes, fluctuations in undersea flora and fauna, etc., thereby minimising the impact of such disasters

Deployment of UUVs/AUVs: The adversarial use of Unmanned Underwater Vehicles (UUVs) and Autonomous Underwater Vehicles (AUVs) for reconnaissance or as potential weapons can complicate UDA efforts, necessitating the need for countermeasures.

Use of Sea Mines: The deployment of mines in underwater regions can pose a significant threat to UDA, as they may be difficult to detect and can disrupt maritime activities by destroying undersea assets.

Counter Electronic Warfare: Adversarial counter electronic warfare capabilities and tactics may disrupt or deceive underwater sensor systems, affecting the accuracy and reliability of UDA data.

Advancement in Technologies: The rapid development of new and niche technologies, including advanced propulsion systems, materials, equipment, and sensors, can outpace UDA capabilities, creating vulnerabilities.

India, due to its strategic location in the IOR and being a credible naval power in the region, realises the clear and imminent danger of a lack of UDA and has initiated a number of measures through multiple agencies, working in tandem, to enhance its UDA capabilities

LACK OF REGIONAL, NATIONAL, OR INTERNATIONAL COOPERATION

Limited or non-cooperation of agencies within the state and among nations in sharing UDA-related information would impede a comprehensive understanding of maritime activities, especially in areas with shared interests.

Environmental Factors: Natural phenomena such as ocean currents, seismic activities, temperature variations, and acoustic conditions can affect the performance of underwater sensors and sonar systems, leading to false positives or negatives.

Cyber Security Concerns: Cyber threats targeting UDA systems, including those related to data integrity, system vulnerabilities, and network security, can compromise the effectiveness of monitoring efforts.

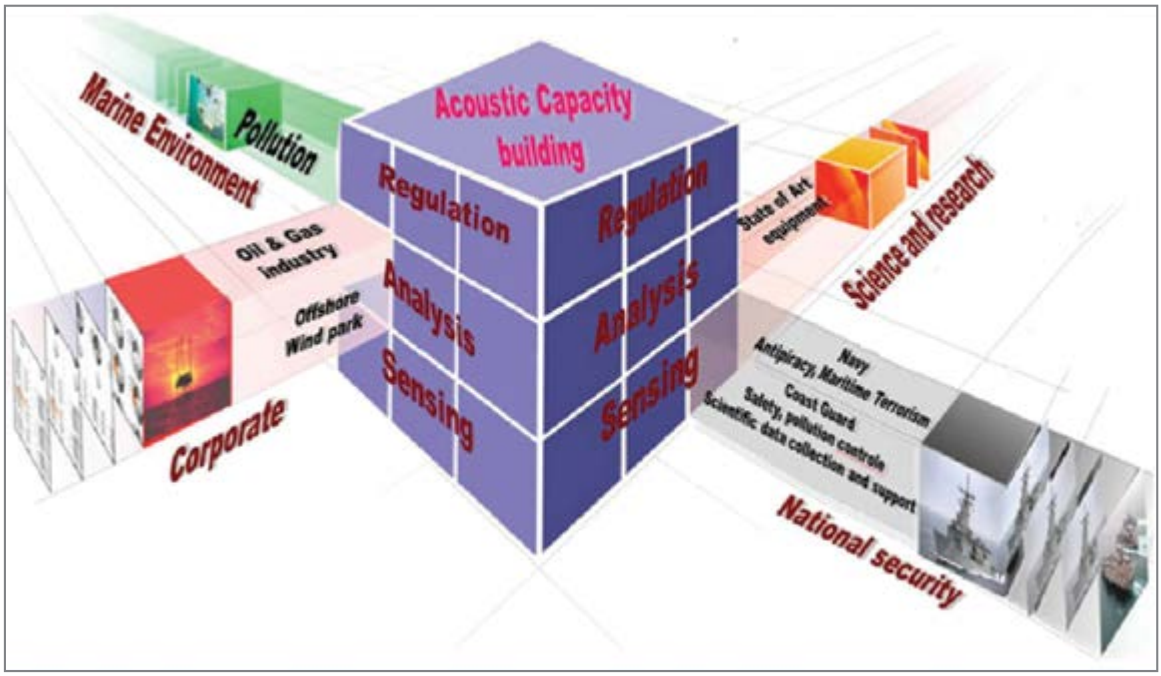
Constraints of Resources: Limited resources, both financial and technological, may hinder the development and maintenance of advanced UDA capabilities, leaving gaps in surveillance coverage.

Legal and Regulatory Gaps: Inadequate legal frameworks and regulations for UDA activities may create challenges in addressing violations or coordinating responses to underwater threats.

Addressing the above-mentioned threats requires a proactive approach to adapting UDA strategies to evolving challenges.

STRATEGY FOR INDIA IN UNDERWATER DOMAIN AWARENESS (UDA)

India, due to its strategic location in the IOR and being a credible naval power in the region, realises the clear and imminent danger of a lack of UDA and has initiated a number of measures through multiple agencies, working in tandem, to enhance its UDA capabilities. The Indian Navy (IN) has been investing in the development of sonar



A Perspective of Underwater Domain Awareness *(Source: www.sundayguardianlive.com/udaframework/global)*

systems, maritime surveillance networks, and anti-submarine warfare capabilities, which are at the core of UDA. Key elements of India's UDA capabilities must include the following:

Sonar Systems: India must develop and deploy various active, passive, or towed array systems and heli-borne sonar devices for detecting underwater threats. These systems must be state-of-the-art for effective UDA, anti-submarine warfare, and for long-range surveillance. This aspect is being focused upon closely by the IN.

Maritime Surveillance Networks: India must develop and sustain a 24x7 maritime surveillance network system. In fact, IN has already established maritime surveillance networks to monitor activities in its coastal waters and Exclusive Economic Zone (EEZ). This includes the deployment of sensors and platforms for real-time information. Information Management and Analysis Centre (IMAC) NC3I network at Gurgaon, Information Fusion Centre-Indian Ocean Region (IFC-IOR) (maritime domain awareness hub for domestic and international information sharing). Mercantile Maritime Domain Awareness Centre (MM-DAC) for enhancing maritime safety, search and rescue capabilities, security, and marine environment protection for up to 1000 kms of India's coastline.

India is pursuing White Shipping Information Exchange (WSIE) agreements and promoting mission SAGAR (Security and Growth for All in the Region). It is establishing a constellation of satellites with CNES France (space-based system capable of continuous ship tracking). In the region of interest, India is establishing a large scale system of Coastal Surveillance Network (CSN) and pushing the Indo-Pacific Oceans Initiative (IPOI) to work in synergy for blue economy and information exchange. Notwithstanding these efforts to bolster MDA, India needs to engage the littoral nations and network differently for reliable UDA.

Anti-Submarine Warfare (ASW) Capabilities: India has to continuously enhance its ASW capabilities. IN's anti-submarine warfare aircraft P-8I Poseidon are equipped with advanced sensors for detecting and tracking submarines. The new Kamorta Class Project 28 ASW stealth Corvettes have superior ASW capability and high endurance. However, waters of the IOR are conducive for sub-surface operations and highly advanced systems are a must for effective ASW operations.

Underwater Sensors and Technology: India has to keep investing in research and development of underwater sensors and technologies. AUVs & ROVs are increasingly being used for underwater exploration and surveillance globally but the trend is not so much in our region. Greater thrust must be accorded by the IN to such technologies.

Setting up Specialised Institutes for Underwater Research: India has to provide sufficient thrust to UDA for which it must create an ecosystem for R&D on UW technologies. New institutes, young entrepreneurs and start-ups exploring the UDA technologies must be established / promoted.

Trained Manpower: A good pool of personnel trained and well-educated about UDA must be continuously created in the country.

International Collaborations: India must continuously engage and collaborate with various countries to enhance its UDA capabilities. Collaborative efforts include joint exercises, information sharing, and technology transfer.

Permanently Deploy Platforms in IOR: UDA information is dynamic and continuous and hence, being in the region assumes significance. India must deploy 24x7 at least two to three patrolling ships with advanced UDA capabilities in the IOR. A research or scientific survey vessel with adequate UDA sensor capability can provide real-time data to networked systems.

Establishing Bases in Other Littoral Island Nations: The possibility of creating a maritime base in a littoral island external to India should be explored so as to extend our reach and augment the MDA/UDA capability.

KEY TAKEAWAYS

The emerging underwater challenges facing India in the IOR are many and complex too. With major economic and maritime powers like China, the United States, and Russia modernising their submarine fleets and building advanced UUVs to enhance surveillance capabilities, the competition in the underwater domain has become intense requiring a serious look at our options. Whilst some actions have been taken positively, and some are promised by the Government, yet UDA is the sector which holds the key to comprehensively control the MDA.

–The writer is a former Indian Navy Submarine Officer, commissioned in 1991 (10+2 X First Course). An alumnus of Naval Academy, Goa, and DSCSC Mirpur, Dhaka, Bangladesh, he served on Kilo Class Submarines, and commanded INS Sindhurakshak. He is a specialist in Anti-Submarine Warfare and deep-sea diving. The views expressed are of the writer and do not necessarily reflect the views of ***Raksha Anirveda***

The emerging underwater challenges facing India in the IOR are many and complex too. With major economic and maritime powers like China, the United States, and Russia modernising their submarine fleets and building advanced UUVs to enhance surveillance capabilities, the competition in the underwater domain has become intense requiring a serious look at our options

SPOTLIGHT

NAVANTIA'S F-110 PROGRAMME FOR SPANISH NAVY AHEAD OF SCHEDULE WITH THE FIRST CUT OF STEEL OF THE SECOND FRIGATE

At Ferrol (A Coruña, Spain): Navantia has started the construction process of the second frigate of the F-110 class for the Spanish Navy, thus confirming the speeding up of this programme valued at €4.325 million.

The first cut of steel of the F-112 took place on December 16 at Navantia's shipyard in Ferrol (A Coruña, Spain), in the presence of the President of the Spanish Government, Pedro Sánchez; the Fourth Vice-President of the Spanish Government and Minister of Finance and Public Function, María Jesús Montero; the President of SEPI, Belén Gualda and the President of Navantia, Ricardo Domínguez.

The programme, whose execution order was signed in 2019, foresees the construction of five frigates. The start of production of the F-112 is four months ahead of schedule, thanks to the high degree of maturity of the design and the progress of engineering work.

The first frigate of the series, the F-111, under construction since 2022, has been also sped up and has gained momentum with a total of 24 out of the 33 blocks (compared to the 18 planned in the schedule) currently in various stages of construction and assembly. Of these, five blocks are already on the slipway, after the fifth of these blocks was set in place on December 18. Moreover, terms of procurement, 98% of the program's equipment has already been acquired, with materials reaching 95% for the F-111 and 70% for the F-112.

The Spanish Navy's F-110 frigates are multi-purpose escort vessels, with anti-aircraft, anti-surface and anti-submarine capabilities that will enable them to perform their force protection and naval projection functions. These ships, which are intended to operate in combination with other units, make them versatile platforms that can perform maritime security-related functions.

The design of this new frigate includes advanced technological features, such as an integrated mast with different sensor and antenna solutions, a multi-mission space that expands the ship's capabilities in

all defence segments and a new hybrid propulsion plant, more efficient and silent, giving the ship great versatility. The frigates will be equipped with the Spanish combat system, SCOMBA, developed by Navantia Systems.

BLOCK FACTORY

The F-110 programme is the main driver of Navantia's Digital Transformation Plan in Ferrol (A Coruña, Spain), which will involve the implementation of a new digital ecosystem that will renew the production centres. In the case of Ferrol's shipyard, it will be materialised through the construction of a new digital block factory with an investment of €110 million (the largest investment made in a shipyard in Spain in this century).

The factory, which first stone was laid on December 16, will be a fully digitalised, automated and robotised plant, including advanced technology machinery, which guarantees product optimisation, versatility and reduced delivery times. In this new open unit manufacturing line, the traditional welding process is replaced by hybrid laser technology, substantially improving performance and minimising distortions.

All of this will boost the region of Ferrol, placing it on the map of excellence in the design and manufacture of frigates worldwide, thanks to an infrastructure of these characteristics, fully digitised, automated and robotised, including advanced technology machinery.

On the other hand, the F-110 programme has an important impact on the supply chain, with more than 500 Spanish companies participating in the programme and a significant generation of employment of up to 9,000 people, including the generation of induced employment.

DIGITAL TWIN

The F-110 frigate will be a smart ship, the first Spanish naval programme designed to have a Digital Twin: a virtual replica of the ship that constantly receives information from the vessel, data permanently supplied by a network of sensors distributed throughout the ship, constituting a cyber-physical system that through the use of behavioural models and technologies such as Cloud Computing, Machine Learning and the Internet of Things (IoT) allows to support its maintenance and operation even thousands of miles away through the Digital Twin deployed ashore.

The Digital Twin is complemented by an Integrated Services System (ISS), developed along with the Universities of Vigo and Coruña (Galicia, Spain), which will provide the ship with integrated sensors in its light points, substantially reducing its wiring. The F-110 will also have 3D printers on board for the manufacture of spare parts. These will be the first ships in the fleet to have an integrated cybersecurity system to protect the vessels against increasing cyber threats. This will enable the ship to have a reduced crew complement for operation, which will result in improved habitability.

GLOBAL NEWS TRACK

INNOVATIVE BLENDED WING BODY

The aviation industry, which is sometimes faulted for its carbon emissions, is always trying to bring out new designs of aircraft, in order to offer enhanced seating capacity for the airlines besides comfort and ease for the passengers. A new ultra-efficient blended-wing jet is being designed by JetZero, which it aims to roll out by 2030

A California-based start-up JetZero says it's working with the US Air Force, NASA and the Federal Aviation Authority (FAA) to get a blended-wing body jet airliner into service by 2030, promising to use an astonishing 50% less fuel, and providing a perfect platform for clean hydrogen airliners.

Previously much has been written and speculated about newly built and flown demonstrator planes by Airbus, NASA and Boeing but most of them reached only the prototype stage and none was able to see the light of the day by putting it into service.

Halfway between a full flying wing design and a traditional airliner shape, a blended wing body uses a wide, flattish fuselage that smoothly blends outward into a pair of wide wings, with no clear dividing line separating the wing from the body.

As per information available the new design offers innovative design with several benefits and flying experience. In the new designed plane, the fuselage itself can contribute much more lift than a typical tube shaped plane, so you don't need as much wing surface.

It's aerodynamically stable, so you don't need a tail wing, and these factors add up to dramatic reductions in drag and weight, leading to smaller engines and further weight savings.

The new blended-wing bodied jet airliner to be put into service by 2030, promises to use an astonishing 50% less fuel, and providing a perfect platform for clean hydrogen airliners

AIRCRAFT

Additionally, there's more room inside for passengers and cargo, with a seating layout that starts looking more like a theatre than a regular airliner.

Much lighter, with higher lift and lower drag, the blended wing design also places its smaller engines on top, significantly reducing noise both in the cabin and on the ground below

When it comes to clean, hydrogen-powered aircraft, the extra storage space out toward the wings is perfect for carrying hydrogen tanks, which are lightweight but take up a lot of space. Indeed, a blended wing concept was one of the three Airbus presented as hydrogen-fuelled future airliners back in 2020.

In terms of drawbacks, the wingspan is wider than a typical airliner, which can restrict the number of airport bays they'll fit into, if they don't run fold-up wings. Also, they're harder to evacuate, and passengers seated out toward the sides experience quite a rollercoaster ride when the plane banks, since they're further out from the roll axis.

Pratt & Whitney GTF™ will power the BWB demonstrator engines. These are geared propulsion systems that offer fuel efficiency and sustainability benefits.

While both NASA and Airbus reported about a 20% reduction in fuel consumption with their prototypes, JetZero reckons they're underselling things.

"The blended wing is 50% more efficient." says JetZero's founder Mark Page. "It uses half the fuel, makes half the carbon dioxide compared to a tube-and-wing aircraft, frankly, even with the same engines. Fuel is the largest line item on an airline's profit and loss statement. A JetZero blended wing cuts that line item in half. That's not just a competitive advantage; in the future, it'll be survival."

According to sources, JetZero has applied for a US $245-million Air Force blended-wing demonstration programme, which would get a full-scale Z-5 demonstrator airborne by 2030, with a view to potentially replacing the 767-derived KC-46 tanker as part of the USAF's Next Generation Air Refuelling System (NGAS).

In the new designed plane, the fuselage itself can contribute much more lift than a typical tube shaped plane, so you don't need as much wing surface

"We're not just building an airliner," says Page, "we're building a multi-mission platform. A platform that can best the best-in-class in every market: an airliner, freighter or a tanker. The US Air Force is interested in this aircraft as a tanker. Remarkably, the JetZero tanker burns only half the fuel of existing tankers today." Indeed everyone would love to see it flying.

Sources: JetZero, Aviation Week, New Atlas Air & Space Forces Magazine

GLOBAL NEWS TRACK

A NEW JET-POWERED DRONE

American billionaire Palmer Luckey has unveiled his company's new Jet-powered Drone, and it looks absolutely outrageous. The high-speed autonomous drone, called Roadrunner, is designed by Luckey's Anduril Industries to intercept and blow up enemy aircraft

Anduril unveiled its latest ambitious project: an autonomous jet-powered drone, designed to serve as an interceptor of aerial threats ranging from large drones to manned aircraft

The new kid on the block i.e. Southern California-based, Anduril Industries says it wants to become the Lockheed Martin of the 21st century. To achieve its goal it is following the hunch by betting on what the US military wants instead of gunning for Pentagon's contracts, the way the private sector defence contractors have operated in the game so far. The company cofounded by billionaire Palmer Luckey, is trying to get there is by developing new aircrafts on its own money.

Recently, Anduril unveiled its latest ambitious project: an autonomous jet-powered drone, designed to serve as an interceptor of aerial threats ranging from large drones to manned aircraft. Anduril says it already has a buyer that it will only describe as a "US customer" and it's set to launch production at a rate of hundreds of them a year.

Twin turbojet engines that enable the drone to reach "high subsonic speed" - presumably approaching 700 mph, power the drone, has been christened Roadrunner. It launches vertically from a climate-controlled box called a Nest that Anduril says will keep the drone ready to go for months at a time in harsh field conditions.

Company's concept is that squadrons of Roadrunners can be stationed at various places throughout the country and dispatched to assess threats picked up on radar or reported by observers. If the blip turns out to be a hostile aircraft, a Roadrunner equipped with a warhead will intercept and blow it up, along with itself. If it's a false alarm, the drone can return to base and land on its tail vertically.

Luckey says that Roadrunner costs in the "low hundreds of thousands of dollars," and "This is a totally new category of weapon that's never really existed before. It's somewhere between a reusable missile and a full-scale autonomous aircraft."

Roadrunner has been designed to defeat

an emerging class of aerial threats, which lie between small quadcopters and ballistic missiles. Apparently Roadrunner focuses on addressing the threat, where it was going and then act accordingly.

So far the company has declined to share specs on Roadrunner's capabilities, but claims that compared with similar drones on the market it has three times the warhead payload capacity, 10 times the one-way effective range, and is three times more manoeuvrable.

Luckey says Roadrunner's engines, which Anduril developed in-house, are "the most power-dense turbojet engines that have ever been built".

The company claims that multiple Roadrunner squadrons could be operated and launched b y a single pilot. The aircraft autonomously determines its flight paths, including intercept courses against a manoeuvring target after being given the command to destroy.

Additionally, it is claimed that a Roadrunner could be used to scope out an unclear threat rather than scrambling a manned fighter or having to make a quick decision to launch a missile, both of which are expensive as compared to the new drone.

In real situations any hasty error by an air defence battery can lead to a tragedy, like the 2020 downing of a Ukrainian airliner in Iran at a time when Iranian forces were on high alert for potential American retaliation to their missile attacks on US bases in Iraq.

Most missions of Roadrunners, are not going to be blowing the target and themselves up but minimising risk, assessing the information and then deciding whether to launch an attack or not.

So far, the company has not clarified whether Roadrunner could be used to intercept faster fighter jets, but it could take some stress off air forces in places like Taiwan and Japan, which have been forced to scramble their fighters at a high tempo in recent years to respond to airspace incursions by Chinese aircraft.

Additionally, Anduril plans to produce non-kamikaze Roadrunners with different types of payloads, such as electronic warfare equipment. The company envisions using them to fight forest fires. If the beginning of a blaze is picked up by satellite or other means, a Roadrunner could jet to the scene and drop a fire suppressant.

Experts say increased use of autonomy will eventually render obsolete one of the most effective current defences against drones - jamming their radio control links with their remote pilots - calling for more brutal countermeasures like Roadrunner.

At a price of a few hundred thousand dollars, using Roadrunner to down a drone like a Shahed-136, which is estimated to cost from $20,000 to $50,000, may make more financial sense than firing a $4 million Patriot missile. But recently Ukraine appears to have had much success taking out the medium-size drones with much cheaper bullet fire from heavy machineguns.

Roadrunner's competitor, RTX's Coyote counter-UAS drone, which may cost roughly half as much as Roadrunner or less at $118,000 per interceptor, is believed to be effective against what are classified by size as smaller Group 1 and Group 2 unmanned air systems (Shahed is a Group 3 system).

Larger Group 4 and 5 drones like China's Reaper or CH-4 are comparable in cost to conventional air defence missiles and can be effectively shot down by them. The new jet-powered drone might be able to chart a new success path for Luckey, based on his claims of Roadrunner's adaptability for both defence and civilian uses, but the overall success would depend on it being co-opted by the US Army.

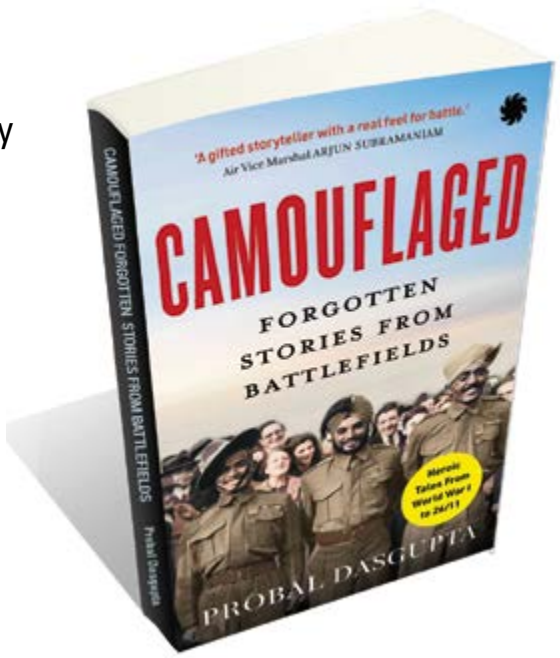
The new jet-powered drone might be able to chart a new success path for Luckey, based on his claims of Roadrunner's adaptability for both defence and civilian uses

BOOK REVIEW

A RIVETING CHRONICLE OF UNSUNG HEROES

Delving into the pages of ***Probal Dasgupta's Camouflaged*** readers embark on a journey through lesser-known military narratives that unfold like a cinematic masterpiece. The book captivatingly explores the mesmerising tales and gripping narratives of courage, camaraderie, valour, determination and resilience, woven intricately into the fabric of India's military history

By **JAY MANIYAR**



Author: Probal Dasgupta
Publisher: Juggernaut, Language: English
IISBN-13: 978-9353453459
Price: ₹699, Pages: 336

Camouflaged **stands as a commendable work, not only enlightening readers about forgotten military stories but also serving as a heartfelt tribute to the unsung heroes who have played a pivotal role in shaping India's military history**

Camouflaged – Forgotten Stories from Battlefields penned by the illustrious author of military narratives, Probal Dasgupta, is a riveting exploration of lesser-known military sagas from India's storied past. This literary endeavour serves as an enlightening guide, unfurling the tapestry of historical events and introducing readers to the unsung heroes who left an indelible mark. Comprising three distinct sections – Parts I, II, and III – the book's meticulously crafted chapters, ranging between twenty-five to thirty pages, unfold with a fluidity that enhances the overall cohesion of the narrative.

The initial section serves as a gateway to Indian war heroes against the tumultuous backdrop of the two World Wars. Dasgupta ingeniously juxtaposes the narratives of World War I pilots, Hardit Singh Malik and Indra Lal 'Laddie' Roy, creating a powerful resonance. The account of Gobind Singh's unwavering determination to deliver critical messages amid the ravages of war provides a poignant tale, while Chanan Singh Dhillon's odyssey as a prisoner of war is vividly portrayed, drawing from the pages of his wartime diary.

As the narrative progresses into the second section, readers are transported to the interwar period leading into the modern era, marked by conflicts initially perceived as low-intensity skirmishes, only to metamorphose into full-scale wars. The tale of Chhewang Rinchen, a volunteer confronting Pakistani raiders post-independence, unfolds in where Rinchen's response to Priti Chand's call sets off a chain of events, ultimately redrawing the Line of Control (LoC) to India's advantage. The India-China border conflict of 1962 and the 1971 war against Pakistan for the liberation of Bangladesh are intricately detailed, with Haripal Kaushik's story in 'Top Guns of Boyra' seamlessly blending the adversities of war with the liberating joys of sport.

The concluding section navigates the landscape of contemporary national security challenges, delving into modern conflicts, terrorism, and associated ills. Sundeep 'Sandy' Sen's firsthand account of the 26/11 Mumbai terror attacks serves as a testament to resilience during the Nariman House siege. The Kargil War (1999) and the prolonged conflict in Assam (1997) unfold through the lens of the unique

bond forged between Indian Major Anand and Pakistani Captain Shoaib Hassan in 'The Militant and the Major.' Subsequently, the narrative unfolds with the tale of the 21 Para Special Forces (SF) and Major Deependra Singh Sengar, where Brigadier Saurabh Singh Shekhawat's valiant attempts to rescue the wounded major showcase the natural camaraderie between officers.

Throughout the book, Dasgupta's narrative prowess shines, seamlessly interweaving historical events with personal accounts. The deliberate decision to keep chapters concise contributes to the book's overall cohesiveness, allowing readers to engage with each story individually while appreciating the overarching theme. *Camouflaged* stands as a commendable work, not only enlightening readers about forgotten military stories but also serving as a heartfelt tribute to the unsung heroes who have played a pivotal role in shaping India's military history.

The compendium of extraordinary narratives in *Camouflaged – Forgotten Stories from Battlefields* paints a vivid tapestry of grit, valour, and unwavering determination. Probal Dasgupta emerges as a laudable storyteller, intricately weaving each of the ten stories with meticulous attention to detail. His geographical precision adds an authentic layer to the tales; ensuring readers are not merely spectators but immersed participants in the unfolding events. The protagonists' remarkable courage and audacity in navigating the complexities of combat elevate them from relative obscurity to revered leaders, earning them both tangible and spiritual accolades.

Reading through the pages feels akin to a cinematic experience, where Dasgupta's adept portrayal of the characters' emotions invites readers to step into the scenes, fostering an imaginative connection with the stories. The author's ability to evoke deep emotional bonds between readers and the characters underscores the mastery of his storytelling craft. One can't help but yearn for more insights into the captivating lives of these star men.

Dasgupta goes beyond the battlefield, shedding light on the nuanced dynamics of cross-border 'friendships' during conflicts and the profound impact of military deployments on families. Despite delving into these intricate details, the book maintains a refreshing simplicity, ensuring that readers from diverse backgrounds can easily immerse themselves in the narratives without feeling overwhelmed.

In essence, *Camouflaged* transcends the boundaries of a traditional military history account; it is a compelling, energising, and emotionally resonant read that transcends genres. The narratives not only provide a wellspring of inspiration but also serve as a testament to the author's adeptness in seamlessly blending action-packed sequences with genuine emotional depth. Dasgupta's meticulous efforts are palpable, evident in the eloquence with which each story is presented, creating a narrative flow akin to a suspenseful thriller that captivates readers from the very beginning and keeps them engaged until the final page.

The chronological progression of the stories, spanning from the world wars of the early to mid-twentieth century to the conflicts of the mid-to-late twentieth century, and culminating in the Mumbai 26/11 terror attacks in the twenty-first century, adds a historical richness to the book. *Camouflaged – Forgotten Stories from Battlefields* stands as a highly recommended literary gem, appealing to connoisseurs from all walks of life, beckoning them to explore the rich tapestry of forgotten tales and unsung heroes that have indelibly shaped India's military history.

–The writer is a Research Fellow at Defence Research and Studies (DRaS) and has been most notably associated previously with the National Maritime Foundation, New Delhi, as a Researcher. His core work lies in the domains of International Relations, the Maritime Domain, and Strategic Studies. His geographical focus areas are the Indian subcontinent, Southeast and East Asia (Japan, South Korea, ASEAN), and the Indian Ocean and Indo-Pacific regions. . The views expressed are of the writer and do not necessarily reflect the views of ***Raksha Anirveda***

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APPOINTMENTS

VICE ADMIRAL DINESH K TRIPATHI TAKES OVER AS VICE CHIEF OF THE NAVAL STAFF

New Delhi: Vice Admiral Dinesh K Tripathi, took over as Vice Chief of the Naval Staff on January 4, 2024. On taking over, the Flag Officer paid homage to the bravehearts who made the supreme sacrifice in service of the nation by placing a floral wreath at the National War Memorial. Prior taking over as Vice Chief of the Naval Staff, VAdm Tripathi served as the FOCinC, Western Naval Command.

An alumnus of Sainik School Rewa and National Defence Academy, Khadakwasla, he was commissioned into the Indian Navy on July 1, 1985. A Communication and Electronic Warfare specialist, he served on frontline warships of the Navy as Signal Communication Officer and Electronic Warfare Officer, and later as the Executive Officer and Principal Warfare Officer of Guided Missile Destroyer INS Mumbai.

He commanded Indian Naval Ships Vinash, Kirch and Trishul. He has also held various important operational and staff appointments which include Fleet Operations Officer of the Western Fleet at Mumbai, Principal Director Network Centric Operations and Principal Director Naval Plans at New Delhi.

The Admiral is a graduate of Defence Services Staff College, Wellington, where he was awarded the prestigious Thimmaiya Medal. He also attended Naval Higher Command Course and Naval Command College at the US Naval War College, Newport, and Rhode Islands in 2007-08, where he won the prestigious Robert E Bateman International Prize. VAdm Tripathi is a recipient of AVSM and NM for devotion to duty. The Flag Officer is a keen sportsman and student of international relations, military history and art and science of leadership.

VAdm Sanjay J Singh Takes Over as Flag Officer Commanding-in-Chief, Western Naval Command

Mumbai: VAdm Sanjay J Singh, took over as the Flag Officer Commanding–in-Chief (FOC-in-C), Western Naval Command (WNC) on January 3, 2024 at an impressive Ceremonial Parade held at INS Shikra. Prior to taking over as the FOCinC WNC, VAdm Sanjay J Singh served as the Vice Chief of Naval Staff at Naval Headquarters, New Delhi. He is a graduate of the National Defence Academy, Pune, and was commissioned in 1986 in the Executive Branch of the India Navy. In his career spanning 37 years, he has served on most class of ships of the Indian Navy and has held a range of command, training, and staff appointments.

He specialised in Navigation and Direction in 1992 and attended the Advanced Command and Staff Course in the UK in 2000. He has undergone the Naval Higher Command Course in 2009 at Naval War College, Mumbai, and the National Security Strategy Course in 2012 at the National Defence College, Delhi. He holds MSc and MPhil in Defence and Strategic Studies from Madras University, MA in Defence Studies from Kings College, London, and MA (History), MPhil (Pol) and PhD (Arts) from Mumbai University.

In recognition of his distinguished service, the Flag Officer was awarded the Nau Sena Medal in 2009, and Ati Vishisht Seva Medal in 2020.

Lieutenant General RC Tiwari Takes Charge of Eastern Command

New Delhi. Lieutenant General RC Tiwari officially assumed the command of Eastern Army Command on January 1, 2024. The officer assumed his new command in a solemn ceremony and paid tribute to the brave hearts and reviewed the impressive Guard of Honour. He exhorted all Ranks to continue working with soldierly pride and honour.

Lt General Tiwari was previously commanding the Uttar Bharat Area and has also commanded the 3 Corps. The General is an Infantry Officer and was commissioned in the Kumaon Regiment of the Indian Army in 1987. The officer is an alumnus of the National Defence Academy, the Defence Services Staff College, College of Defence Management and the National Defence College. He has held several prestigious command and staff assignments in conventional as well as counter-insurgency operations in India and abroad. He commanded an infantry battalion in Counter Insurgency Operations, Mountain Brigade in High Altitude and Black Cat Division as General Officer Commanding.

RAdm R Dhankhar Takes Over Command of Eastern Fleet

New Delhi. Rear Admiral Rajesh Dhankhar, took over Command of the Eastern Fleet, the Sword Arm of the Eastern Naval Command, from Rear Admiral Gurcharan Singh, on November 10, 2023. The change of guard took place at an impressive ceremony held at Naval Dockyard, Visakhapatnam. RAdm Rajesh Dhankhar was commissioned into the Indian Navy on July 1, 1990 and is a specialist in Navigation & Direction. The Flag Officer is an alumnus of the prestigious Naval Academy, Defence Services Staff College, and has done his Higher Command Course in Japan. During his illustrious career spanning 33 years, the Flag Officer has tenanted specialist appointments onboard warships Pondicherry, Godavari, Kora and Mysore. The officer has also done instructional tenures in the erstwhile Project 15 Training Team, Navigation & Direction School and at Officer's Cadet School, Singapore. The officer also tenanted additional duties of Chairman Carrier Acceptance Trials Team to oversee the acceptance trials of INS Vikrant. The Flag Officer is a recipient of the Nao Sena Medal (Gallantry) in 2015 for Non-Combatant Evacuation Operations (NEO) of Indian nationals from Aden and Al-Hodeida, Yemen.

Air Marshal Makarand Ranade Takes Over as DG (Inspection & Safety)

New Delhi. Air Marshal Makarand Ranade December 1, 2023 took charge as Director General (Inspection and Safety) at Air Headquarters. An alumnus of National Defence College and College Interarmée de Defense at Paris, France, the Air Marshal was commissioned in the fighter stream of the Indian Air Force on December 6, 1986. In a career spanning over 36 years, the Air Marshal has held key field and staff appointments. These include command of a fighter squadron and two flying stations. He has been a directing staff at Tactics and Air Combat Development Establishment as well as at Defence Services Staff College. He has served as Air Attaché at Embassy of India Kabul, Afghanistan. His staff appointments at Air Headquarters include Director, Personnel Officers, Principal Director, Directorate of Air Staff Inspection and Assistant Chief of Air Staff Operations (Space). Prior to his present appointment, he was the Senior Air Staff Officer at Headquarters, Western Air Command here.

Lt Gen Manjinder Singh Takes Charge as GOC-in-C, Army Training Command

Chandigarh: Lieutenant General Manjinder Singh took over as the 24th General Officer Commanding-in-Chief of the Shimla-based Army Training Command on December 1. Prior to this, he was serving as Deputy Chief of Integrated Defence Staff (Policy, Planning and Force Development.

Commissioned into 19 Madras in December 1986, Lt Gen Manjinder Singh is an alumnus of Sainik School Kapurthala, National Defence Academy, Khadakwasla and the Indian Military Academy. He commanded his battalion in an intense counter-insurgency environment in Jammu and Kashmir, an infantry brigade on the Line of Control, an infantry division as part of a strike corps and a corps deployed along the Line of Control in counter insurgency operations in Jammu and Kashmir.

Besides varied staff appointments in corps and commands along the western front and in the counter insurgency operations environment, he has been an Instructor at the Indian Military Academy and Indian Military Training Team in Bhutan. He has attended the National Defence College course in Thailand. Lt Gen Manjinder has been decorated with the Yudh Seva Medal and Vishist Seva Medal. He is the Colonel of the Madras Regiment.

Rafael Appoints Yoav Turgeman as CEO

Haifa: Rafael Advanced Defense Systems Ltd. on December 6 announced the appointment of Yoav Turgeman as the Chief Executive Officer of the company. This strategic decision was made by the board of directors, who, in a unanimous choice, selected Yoav Turgeman based on the recommendation of the search committee. The selection process adhered to the rigorous standards for CEO appointments in government-owned entities. The appointment is pending approval from the appointments committee, the Minister of Defence, and the Regional Cooperation Minister responsible for government companies. Yoav Turgeman, served in various command and staff roles in the Israeli Navy for 25 years, retiring as a Colonel. Following his military service, Turgeman entered the aerospace industry, initially heading the "Arrow" program and later managing the MLM facility. Since 2018, he has been serving as the CEO of "Elta."Possessing bachelor's and master's degrees with honors in electrical engineering from Tel Aviv University, along with additional degrees from the University of Haifa and Bar Ilan University, Turgeman is well-equipped to lead Rafael. He will succeed Major General (Ret.) Yoav Har-Even, who served as the CEO for over 8 years.

Boeing Names Stephanie Pope, Chief Operating Officer

ARLINGTON, Virginia. Boeing recently announced Stephanie Pope as executive vice president and chief operating officer of The Boeing Company. In this newly created position, effective January 1, 2024, Pope will report to Boeing President and Chief Executive Officer Dave Calhoun. As Boeing COO, Pope will oversee the performance of the company's three business units with responsibility for driving supply chain, quality, manufacturing and engineering excellence across the company. The business unit Chief Executive Officers, the Boeing Chief Engineer and the President of Boeing Global will report directly to Pope. Senior corporate functional leaders will continue reporting to Calhoun.

RTX Names Christopher T Calio to Succeed Gregory J Hayes as CEO

ARLINGTON, Virginia. In a planned leadership transition, RTX recently announced that President and Chief Operating Officer Christopher T. Calio will succeed Gregory J. Hayes as chief executive officer at the 2024 RTX Annual Shareowners Meeting scheduled for May 2. Hayes will continue to serve as executive chairman of RTX. Calio was also appointed to the company's board of directors.

NEWS ROUND UP

IN A FIRST, EMIRATI GUIDED WEAPONS TO BE EQUIPPED ON UAE'S FRENCH RAFALE F4 FIGHTER FLEET AND TEJAS

Dubai: The United Arab Emirates' largest defence conglomerate plans to equip the nation's new Rafale F4 fighter jets with a subsidiary's precision-guided munitions, in what would be a first for the French-made jet and also India's HAL Tejas fighter jet exhibited at the Dubai Airshow 2023 - equipped with Al Tariq precision guided munitions, in a move to convince the Indian military to give it a shot after testing.

"This will be a limited integration," said Al Tariq CEO Theunis Botha adding "but serving the purpose of demonstrating the capabilities of one the aircraft integration between the two companies and the performance of the alternate weapon system." He said the testing in India is expected to take place in early 2024, "and we hope to have it completed by third quarter of 2024."

Three different munitions — the Mk81, Mk82 and longer-range Mk83 bombs that EDGE subsidiary Al Tariq modifies into precision-guided missiles — will all be integrated on the fourth generation plane in due course, Botha said.

"The entire family of Al Tariq is being integrated onto all the Rafale fleet to the UAE," he said and so fulfilling a requirement by the Emirati air force for indigenous weapons to be fitted to the combat jet. "We are in discussions with them to team for this integration and contracts are already in place," added Botha. "The first Rafale aircraft will be delivered around 2027, and we would be in time to have the integration completed by that time."

He also said he "hopes" Al Tariq and Dassault, the French firm that makes the Rafale family of fighter jets, can reach agreement on approval for other Rafale users to equip their respective fleets with Al Tariq weapons. The Al Tariq precision-guided versions of the Mk81 and Mk82 munitions were both displayed beside a French Air and Space Force Rafale FR3 aircraft. Al Tariq's modular precision guidance system fits on the Mk80 series, turning their short-range munitions into Al Tariq-S and the long-range ones Al-Tariq-LR missiles. The Emirates is set to become the first F4 operator outside of France, with delivery of 80 aircraft originally scheduled to run from 2026 to 2031 in a deal worth a massive $19 billion. Botha's remark about deliveries starting in 2027 suggests this initial timeline may be a bit off track.

France announced the order from Abu Dhabi in December 2021, which remains Dassault's largest ever. But for the UAE, the acquisition also signalled a committed effort to modernize strike capabilities, set against the threat of Iran and its regional proxies.

BOEING SCOUTING FOR GLOBAL CUSTOMERS FOR T-7A RED HAWK

Dubai: Back in 2018, when Boeing bid aggressively to win a US Air Force competition to build what is now the T-7A Red Hawk, the company's strategy raised concerns about the aircraft's profitability — concerns that on the surface appear borne out now that the program has cost the aerospace giant approximately $1.3 billion in losses so far on its fixed-price contract. But a top Boeing official says the strategy that secured the Air Force's trainer program is nevertheless shaping up to pay dividends in the long run, as customers abroad express desire for a new trainer

of their own, and the US military services move toward separate training programs for different mission requirements. According to reports, the US Air Force is even interested in converting the jet into an armed fighter to replace older F-16s, possibly calling for even more potential production by Boeing for the service alone.

In the past, Boeing and partner Saab, which makes the jet's aft fuselage, have set a goal of selling over 2,700 of the trainers by leaning into the international market. Despite optimism about its future, Boeing isn't out of the woods yet for the T-7A's development. The Government Accountability Office has voiced scepticism about the program's re-baselined production decision now set for February 2025, though the Air Force has expressed confidence that timeline could be met.

EXPANDING COLLABORATION: AIRBUS, TATA TO SCALE UP DEFENCE PRODUCTION, BROADEN SUPPLY CHAIN

New Delhi: Tata Advanced Systems has increased its collaboration with Airbus SAS to broaden India's defence supply chain and introduce new products that align with India's defence requirements. The partnership is for investing in developing capabilities, including manufacturing detailed parts, raw material acquisition, and establishing sub-assembly and assembly facilities. The project will unfold in phases, with the primary focus in the initial step being on metallic and composite manufacturing technologies, along with electric harnesses to strengthen the country's supply chain. The goal is to meet the demand for military transport aircraft as India moves towards replacing its ageing military transport fleet.

In 2021, Airbus signed an agreement with the Indian Air Force for 56 C-295 military transport aircraft valued at Rs 21,395 crore. Airbus aims to leverage the supply chain for various defence platforms beyond transport aircraft, as the Indian military requires around 100 planes. This strategic partnership further aligns with the country's efforts to establish a strong domestic defence supply chain, encouraging global defence companies to invest and manufacture in India.

India's initiatives such as Defence Acquisition Procedure 2020, indigenisation lists, and defence industrial corridors, are aimed at facilitating foreign company entry, supporting start-ups, and boosting research within the country.

MERLINHAWK AEROSPACE AND VEGA COMPOSITES SIGN JOINT VENTURE AGREEMENT, TO ESTABLISH COMPOSITES MANUFACTURING AND DESIGN FACILITY IN TAMIL NADU DEFENCE CORRIDOR

Bangalore: Merlinhawk Aerospace Pvt Ltd, a 100% Indian aerospace and defence engineering design and manufacturing company has signed a joint venture (JV) agreement with Vega Composites S.r.l. (Italy), to establish a composites manufacturing and design facility in the defence corridor in Tamil Nadu for advanced composites material-based products. The new entity will be called Merlinhawk Composites and Engineering Private Limited.

The agreement was signed in the presence of the Indian Ambassador to Italy and San Marino, H.E. Dr Neena Malhotra. This strategic joint venture is aimed at tapping the growing market of India while developing design expertise and transferring manufacturing knowhow to India.

Merlinhawk Composites will be targeting the growing demand for composites based products in the aerospace, marine, land and railway sectors. Additionally, the company will be targeting the upcoming hydrogen storage and fuel cell markets. Merlinhawk Composites will also be targeting export markets by providing design services and turnkey solutions for customers. Vega Composites is a group company of Gruppo Pasquali and a leader in the composites market in Italy. Vega Composites specialises in design and manufacture of composite structures, special steels, light alloys and titanium.

Merlinhawk is an AS9100D (ISO9001:2015) certified company, with over three decades as a trusted partner for OEMs, user agencies and operators in the aviation and defence sectors in India for customised solutions. Backed by all requisite accreditations as a military and civil design organisation, Merlinhawk offers high technology electronic and electromechanical products for reliable performance, especially in rugged and highly challenging environments. Merlinhawk has recently added a EMS SMT line in a ISO 8 Class clean room and a cable harness assembly shop catering to various domestic and international customers.

NEWS ROUND UP

DRDO SEEKING INDUSTRIAL PARTNERS FOR ITS LASER-

New Delhi: With lasers becoming an indispensable part of modern day battlefield and depending on the wavelength and power, lasers have wide spectrum of military applications from dazzling human eye to shooting down a UAV, guiding munitions for precision strike, imaging enemy targets and detecting chemical, biological and explosive materials.

Having developed this technology, the Defence Research and Development Organisation (DRDO) is looking for industries to transfer its laser-induced sensing technology. The technology was developed by the DRDO's Laser Science and Technology Centre (LASTEC) to detect biological agents.

LASTEC is working for the development of laser source technologies for Directed Energy Weapon (DEW), dazzling and imaging

ROCKET LAB TO ESTABLISH SPACECRAFT PARTS MANUFACTURING FACILITY IN MARYLAND

Maryland (USA): Rocket Lab, a provider of launch services and spacecraft systems, is establishing a manufacturing facility here to meet growing demand for advanced materials used in space missions. The California-based firm will develop systems hardware at the Space Structures Complex, including satellite dispensers, panels and accessories, solar panel substrates and spacecraft buses, it said in a statement.

The announcement marks an expansion of Rocket Lab's space systems business, the company said, and is "designed to deliver a comprehensive suite of advanced composite products for the space industry and to further vertically integrate supply for the company's internal needs across launch and space systems."

Rocket Lab already has composite manufacturing facilities in California, New Mexico and New Zealand. The new building will allow the company to expand that capability closer to its integration and test complex in Virginia. The 113,000 square foot complex — a former Lockheed Martin launch facility in Middle River — will also help establish a long-term supply line for the composite structures needed to support Rocket Lab's new launch vehicle, Neutron.

The reusable, medium-lift rocket, designed to carry 13,000 kilograms (14.3 tons) to orbit, is slated to fly for the first time next year. The launch vehicle is larger than the company's workhorse rocket, Electron, which can lift 300 kilograms. The spacecraft carries small satellites to orbit.

The company also operates a variant of Electron that can be used to test hypersonic systems, which can fly at speeds of Mach 5 or higher. Rocket Lab's HASTE launch vehicle is a modified version of its Electron rocket designed to support hypersonic flight testing. Called the Hypersonic Accelerator Suborbital Test Electron rocket, or HASTE, the vehicle is being used by the Defence Department to support flight tests. Rocket Lab announced November 8 that HASTE was selected for the Defence Innovation Unit's Hypersonic and High-Cadence Airborne Testing Capabilities, or HyCAT, program. The mission will feature a payload developed by Australian company Hypersonix.

INDUCED SENSING TECHNOLOGY

applications. It is developing standalone sensor systems using different laser sources for applications like detection and location of optical targets and detection and identification of chemical, biological and explosive materials. Other laser systems developed by LASTEC include unexploded ordnance disposal system and different variants of dazzlers. LASTEC is also working in the area of electro-optic countermeasure systems and development of laser materials.

Over the years, LASTEC has acquired the expertise in designing, testing and evaluation of different types of laser sources and systems. Gas Dynamic Laser and Chemical Oxygen and Iodine Laser Sources of the order of tens to hundreds of kilowatts for DEW application have been successfully developed and demonstrated. Recently, single mode kW class Fibre Laser Source was realised in collaboration with foreign experts making India only the 6th (known) country to possess the requisite technological knowhow. Efforts are channelized in scaling the power levels of these laser sources.

The technology has a detection range of 1,000 meters. The detector uses an ICCD Spectrometer and PMT. The DRDO also has an Industry Academia Centre of Excellence (DIA-CoE) at the University of Hyderabad. Pointing out that laser is a powerful technology for homeland security in defence as well environmental sciences and medical sciences, DRDO says that in the present scenario due to increased bio-terrorist activities, threat to military personnel and civilians appears in the form of biological, chemical warfare (BCW) agents and explosives.

THALES EXPANDS FOOTPRINT IN INDIA, OPENS 2ND OFFICE IN BENGALURU

Bengaluru / New Delhi: Thales, a global leader in Defence, Aerospace, and Digital Identity & Security, launched its new office in Bengaluru on November 29, 2023. Yannick Assouad, Executive Vice President, Avionics, Thales officiated the ceremony, accompanied by Ashish Saraf, VP and Country Director for Thales in India.

The new building will serve as an extension of Thales' Engineering Competence Centre (ECC) in Bengaluru, inaugurated in 2019, in support of the Group's ambitious ramp-up plans in the region and country. This ECC is a first-of-its-kind Centre in India focusing on software and hardware capabilities in civil and defence businesses serving Thales's global needs. Since its launch, the centre has played a significant role in job creation and skill development in India, growing to over 500 in staff. Thales invests close to €4 billion globally in R&D every year. This ECC, along with an additional centre based in Noida, form one of the Group's three major engineering competency centre hubs.

Thales' engineering teams in Bengaluru are contributing to high-value-added systems in

the fields of aerospace and defence, including Air Traffic Management, complex avionics systems, cockpit, flight management and connectivity systems, radar software, airborne Intelligence Surveillance and Reconnaissance tactical management systems, among others.

The state-of-the-art facility will provide a modern, sustainable and open office work environment. Drawing inspiration from Dravidian architectural forms and Brahmi script, the site is a fusion of contemporary design and traditional aesthetics. The new office is designed to be a disabled-friendly facility, with smart working spaces, abundant greenery and power-saving features, in line with Thales' global societal and environmental commitments.

NEGOTIATIONS UNDERWAY TO BUY LONG RANGE CRUISE MISSILE- SCALP FOR RAFALE-M FIGHTERS

New Delhi: After France offered local production of submarine-launched Naval Scalp missiles, for the three additional Scorpene submarines that the Indian Navy is buying from France, negotiations are underway between the Indian Navy and MBDA, Scalp missile manufacturer, for acquisition of these missiles as part of the weapons package for 26 Rafale-Ms, reported a media outlet.

Last month, India submitted a letter of request (LoR) to French government to buy 26 Rafale-M fighter for INS Vikrant.According to the report, these missiles will give the navy a significant capability boost compared to the Mig-29K, KH-31 combination. Scalp missiles have a strike range of more than 300 kilometres. Scalp missiles are stealth long-range fire and forget missiles which carries a warhead of 450 kg, that can destroy heavily defended, high-value enemy targets like command and control centres, ammunition depots, petroleum, oil and lubricants (POL) dumps and bunkers.

The submarine-launched variant has a strike range of close to 1,000 kilometres. Scalp missiles have also demonstrated their effectiveness in various wars, with the most recent being the Ukraine-Russia war, where the French supplied missiles were successfully able to destroy a ship and a submarine docked at a naval station and Russian Navy's Black Sea Fleet headquarters. Bought with the thirty-six Rafale fighters acquired in 2016, the Indian Air Force (IAF) already operates Scalp missiles. While the IAF Rafales can carry two Scalp missiles, its naval variant, the Rafale-M, can carry only one Scalp missile.

NEWS ROUND UP

INDIA EVALUATING ISRAELI DEVELOPED COUNTER UAS SYSTEMS

Tel Aviv: India is evaluating Israeli developed counter UAS systems (CUAS). Demonstrations and actual negotiations have been delayed because of the ongoing war between Israel and the Hamas terror organisation in Gaza and the Hezbollah in Lebanon.

Indian company Adani Defence that has close working relations with the Israeli defence industry, is coordinating the selection process that has been delayed because all the Israeli defence companies are working 24/7 to supply the requirements of the Israeli Defence Forces (IDF).

According to Israeli sources, the three systems that are being evaluated are – the Drone Guard made by ELTA, the electronics subsidiary of Israel Aerospace Industries (IAI), the Drone Dome made by Rafael and the ReDrone made by Elbit Systems.

ELTA's Drone Guard is based on a combination of 3D radars that trace the air targets, through electro-optical and COMINT means and a dedicated UAS flight disruption system. The Drone Guard system features an integrated multi-layered sensor system that includes: 3D X-band radar that detects and tracks all types of drones; dedicated COMINT system that classifies the drone by its transmission (using the information to verify the target and reduce false detection rates); an EO/IR camera used to classify the detected object; and a Jammer that neutralises and intercepts the object.

Rafael's Drone Dome is a radar and laser-beam system for detecting and destroying drones, with the company adapting its existing laser systems to handle the threat. Once the system's radar identifies targets, its laser system destroys them. Drone Dome also features a jamming system for disrupting communications between the drone and its operator. Drone Dome's range reaches several miles, but causes minimal interruptions to other systems in nearby urban areas. The drone threat is neutralised by activation of directional GPS/GNSS and radio-frequency inhibitor/jammer devices. A laser weapon is optional.

The Elbit Systems ReDrone can detect, identify, locate and neutralise commercial drone threats in real-time, delivering exceptionally effective countermeasures for civilian, HLS, military and paramilitary defence.

The company says that the ReDrone system has been developed using sophisticated, field-proven SIGINT and EW technologies to create a two-level solution that provides options for both short and long-range protection.

The three companies said that there is an interest in their systems in India but were reluctant to comment on any negotiations.

AIRBUS SIGNS CONTRACT WITH THE SPANISH MoD FOR THE ACQUISITION OF SIRTAP UAS

Getafe. Airbus has signed a contract with the Spanish Ministry of Defence (MoD) for the development and acquisition of SIRTAP, a High Performance Tactical UAS that will reinforce the tactical capabilities of the Spanish Army and the Air and Space Force.

This contract includes a total of nine systems, each consisting of three unmanned aerial vehicles and one ground control station. Furthermore, two simulators will be supplied to train the Spanish Armed Forces. SIRTAP, with a payload of more than 150kgs, has been designed for advanced surveillance, intelligence and reconnaissance missions, both over land and at sea. A range of more than 2,000km and an endurance of more than 20 hours will provide high flexibility and reactivity, allowing for day and night operations in the most demanding environments. The system will be certified to fly in segregated airspace.

In the future, this tactical UAS will be able to operate jointly with other platforms to be integrated into a system of systems. The development of SIRTAP will bring the national industry key experience and competences in the field of Remote Carriers for FCAS.

First flight of the SIRTAP prototype is expected to take place in 2025

NAVANTIA TO STRENGTHEN ITS INDIA PRESENCE, PLANS TO BID FOR INDIAN NAVY'S LANDING PLATFORM DOCKS CONTRACT

New Delhi: Spanish state-owned shipbuilding company Navantia is planning to bid for Indian Navy's contract to build four amphibious transport vessels. This will add to Navantia's other bid to develop six submarines–that's considered to be "India's largest defence acquisition project."

According to José Porto, managing director of Navantia India, the company will bid for the four landing platform dock (LPD) amphibious vessels along with Larsen and Toubro as part of its efforts to strengthen its presence in the Indian defence market.

In an interview, Porto said that Navantia has been working on the project since 2008, which had been cancelled twice in the past. The Indian Navy had released a Request For Information for the contract in 2021. Navantia expects the Navy to submit a request for proposal for the project next year.

In 2018, the Navantia-built Juan Carlos I, in service of the Spanish Navy, visited Mumbai as the company sought to display the vessel's military capabilities. LPD vessels can be used to transport military assets, supplies, and manpower for warfare, as well as for humanitarian assistance and disaster relief.

Jose Porto further said that the company's LPD vessels are also in the service of the Australian Navy. Additionally, Navantia will also be looking for Indian partners to build wind turbine and renewable energy projects

in foreign markets. "We are looking for partners in India to work with us for programs and projects not only in India but also in other countries in Europe and America," said Porto.

Elaborating on the company's other ambitions in India, Porto said Navantia was confident in its bid to build six submarines for the Indian Navy under the P75 (I) program. For that, too, Navantia has signed a teaming agreement with Larsen and Toubro.

In a statement announcing its agreement with Larsen and Toubro earlier this year, Navantia said "Expected to be valued at over Euro 4.8 billion, the project is India's largest defence acquisition project. This would also be followed by a 30-year lifecycle sustenance contract of similar value."

While equipping the Navy with submarines having air independent propulsion technology, which gives submarines greater endurance, the P75 (I) project aims to build up India's indigenous defence production capabilities. Germany's ThyssenKrupp Marine Systems (TKMS) has also expressed interest in bidding for the submarine contract.

For P-75(I) project, Navantia is expected to use the design of its S80 submarine class. Earlier, in an interview with a media outlet, Spanish Ambassador to India, Jose Maria Ridao Dominguez, mentioned that Navantia possessed the latest propulsion technology, making the company's bid for the Indian Navy's contract competitive.

BEL RECEIVES ORDER WORTH RS 4,878 CRORES

Bengaluru: Defence PSU Bharat Electronics Limited (BEL) has received an order of Rs 4,522 crore from Indian Army for the supply of Fuses for various calibres. The contract was signed on December 15, 2023, by Maj Gen Gurpreet Singh Choudhry, SM, VSM [JS (Army & TA)/DMA] and Bhanu Prakash Srivastava, CMD, BEL, in the presence of Vice Admiral Atul Anand, AVSM, VSM, Additional Secretary (DMA).

Indigenisation of critical technologies was the key requirement of the tender.

This project will have the participation of Indian Electronics and associated industries, including MSMEs which are sub-vendors of BEL. The equipment manufactured by BEL are part of the 'Aatmanirbhar Bharat' programme.

The company also received additional orders worth Rs 356 crore since the last disclosure on December 6, 2023 and the said orders pertain to other products like EW (Electronic Warfare) Testers, Medical Systems (Exports), Consumables and Batteries for Electronic Voting Machines (EVMs), Night Vision Devices Spares and Services. Till date, BEL has cumulatively received orders worth Rs 2,3176 crore (excl. taxes) in the current financial year 2023-24.

NEWS ROUND UP

ISRAEL AEROSPACE INDUSTRIES, GERMAN COMPANY FFG TO FORM JOINT VENTURE COMPANY

Tel Aviv: Israel Aerospace Industries and German company FFG are joining forces in the land sector, entering into a joint venture and setting up the new German company FTS Flensburg Technology Systems.

The primary goal of the new company will be the progressive fusion of FFG's innovative vehicle systems and pioneering technology carriers and IAI's field-proven state-of-the-art product solutions in fields such as robotics, autonomous capabilities, artificial intelligence, digitalisation and networks, radar, SIGINT, electronic warfare, and situational awareness.

FFG, an established German defence technology systems house – a manufacturer of national key technology in armoured vehicle development and corresponding protection solutions – contributes decades of experience and exceptional knowhow in manufacturing, retrofitting, optimisation, and combat effectiveness as well as in system maintenance.

IAI is one of the largest Israeli companies in the defence and security technology sectors – and is an internationally successful specialist in radars, situational awareness, robotics, and digitalisation as well as in the production and development of radar technology, SIGINT, EW, automated and artificial intelligence, sensors, and anti-drone technology. The companies said that with the new cooperation they will be in a stronger position to successfully meet the upcoming requirements of modern armed forces for the battlefield of the future, along with the needs of national and international customers accordingly.

Particularly in the light of the current security policy challenges, FFG and IAI representatives are convinced that this strategic joint venture will enable the new company to provide our partner states worldwide, with successful advanced solutions and expedient support for the national and global challenges they face.

GERMAN NAVY NH90 SEA TIGER PERFORMS MAIDEN FLIGHT

Donauwörth. The first NH90 Sea Tiger took off on-schedule for its maiden flight, at Airbus Helicopters' site in Donauwörth, Germany. The German Bundeswehr ordered 31 NH90 Sea Tiger multi role frigate helicopters for the German Navy's shipborne operations in 2020. Airbus Helicopters is now entering a qualification phase that will focus on flight testing the helicopter and new systems to be installed on board the NH90 Sea Tiger. Deliveries are scheduled to begin at the end of 2025.

The helicopters will replace the German Navy's ageing Mk88A Sea Lynx fleet which entered into service in 1981. The Bundeswehr already operates 18 NH90 Sea Lion naval transport helicopters which were delivered on schedule between 2019 and 2023.

The Sea Tiger is the latest version of the proven NH90 NFH (Naval Version). It has been specifically designed to match the needs of the German Navy for a state of the art anti-submarine warfare helicopter. Novelties include a new Electro-Optical System and improved Electronic Support Measures (ESM). On top, the Sea Tiger is equipped with a dipping sonar, sonobuoys, and weapons (torpedoes and missiles). The shipborne Sea Tigers' missions include, in addition to reconnaissance and transport, engaging targets above and below the surface. 135 naval NH90 helicopters have already been delivered to six nations and have completed over 90,000 flight hours in search and rescue, humanitarian, and military operations. There are more than 500 NH90 helicopters in service worldwide that have accumulated over 370,000 flight hours.

NHIndustries is the largest rotorcraft joint venture and it is responsible for the design, manufacturing and support of the NH90 helicopter, one of the leaders in the latest generation of military helicopters. The Company takes the best from the European rotorcraft and defence industry, being owned by Airbus Helicopters (62.5%), Leonardo (32%) and GKN Fokker (5.5%). Each company has a long aerospace pedigree and brings the top of its skills and expertise to the end product.

RAMAN RESEARCH INSTITUTE DEVELOPS INDIGENOUS EXPERIMENTAL FACILITY

New Delhi: Scientists at the Raman Research Institute (RRI) have indigenously built an experimental facility to simultaneously cool and trap a large number of sodium and potassium atoms near absolute zero temperatures using laser light and magnetic fields. With this, RRI, an autonomous institute funded by the Department of Science and Technology, Government of India, has joined the handful of laboratories globally to demonstrate such efficient simultaneous production of a mixture of two species of ultra-cold neutral atoms with inter-species interactions control. The results from this experiment can deepen the knowledge required for developing quantum technologies such as quantum computing, quantum sensing and metrology - all of which are the frontier areas of research.

Built over a period of five years, this specialised experimental facility comprises four interconnected ultra-high vacuum chambers, where atoms are trapped and cooled under a pressure to the tune of 10-11 millibar (equal to 14 orders lower than the normal atmospheric pressure). There are multiple intricate Laser systems, optical arrangements and high-resolution detections systems. Using techniques of flashing light onto the atoms, the researchers said that it was possible to manipulate properties of atoms and use it for taking various measurements that are fundamentally quantum mechanical in nature.

HENSOLDT ENTERS INTO STRATEGIC COLLABORATION WITH WINGS FOR AID

Immenstaad. Sensor solution provider HENSOLDT and the Dutch company Wings For Aid have entered into a strategic partnership. The aim of the two-stage cooperation is to improve the air safety of cargo drones. Wings For Aid has developed the "MiniFreighter", a 650-kg Remotely Piloted Aircraft System (RPAS) that delivers humanitarian goods to people isolated by natural disasters and man-made crises. In the first phase, these cargo drones will be equipped with the "SferiRec LCR 100" flight data recorder. Equipped with this, the drone will have a significantly improved recording capability of the flight attitude data and the flight control system. The drone has already completed successful flight tests at various locations, including Magdeburg-Cochstedt airfield. This is home to the DLR's National Test Centre for Unmanned Aircraft Systems, one of Wings For Aid's partners. In a possible second step, further technical upgrades will be added to increase aircraft autonomy and improve the Wings For Aid flight test capability as Original Equipment Manufacturer (OEM) and global system provider. The operational data collected from test and flight missions up to that point can be used directly for this purpose. Capabilities such as "Detect and Avoid" (DAA) and the improvement of the Drop Zone Safety Automation System should then ensure that the operational range is increased and the workload of the pilot-operator is significantly reduced. This is essential to scale up so-called BVLOS (beyond visual line of sight) flights with multiple aircraft.

BEL RECEIVES ORDERS WORTH Rs 3,000 CRORE

Bengaluru: Defence PSU Bharat Electronics Limited (BEL) on September 15 announced that it has received an order of Rs 2,118.57 crore from Cochin Shipyard Limited for supply of various equipment for Indian Navy. The order consists of Sensors, Weapon equipment, Fire Control systems and Communication equipment for six numbers of Next Generation Missile Vessels (NGMV), class of anti-surface warfare corvettes. The project will have participation of Indian electronics and associated industries, including MSMEs, which are sub vendors of BEL. The equipment manufactured by BEL are part of 'Aatmanirbhar Bharat' program. Recently, the defence major also received additional orders worth Rs 886 crore and the said orders pertained to upgrade of AFNET SATCOM N/W, upgrade of Akash Missiles with RF Seeker, Inertial Navigation System and other equipments with accessories and spares etc. Earlier in June, the company had bagged defence and non-defence orders worth Rs 2,191 crore. The orders were for supplying long-range guidance kits with warheads, airborne jammers, battlefield short range surveillance radars upgrades, missile guidance radars, shallow water craft sonars and spares, among others, it said in a statement. In the financial year 2023-24, BEL till now has received orders worth Rs 14,384 Crore.

NEWS ROUND UP

HFCL OFFERS CUTTING-EDGE SURVEILLANCE RADARS

New Delhi: Known for communication products, Indian tech company HFCL is stepping up its game in defence technology. Making its foray into radar tech to meet the critical needs of Defence and Security Forces for Information, Surveillance, and Reconnaissance (ISR), HFCL is making radars that are super advanced and can perform multiple roles.

Through its subsidiary, Raddef Private Limited, HFCL has come up with a range of Surveillance Radars that uses Frequency Modulated Continuous Wave (FMCW) technology. This technology gives them an edge – they are super accurate, use less power, and are resistant to interference. Apart from keeping an eye on borders, the radars can also help with weather monitoring and navigation. Moreover, they are versatile, portable, and can handle tough terrains easily.

Additionally, HFCL is also working on a high-end Drone Detection Radar. Their ongoing research covers a bunch of radar technologies, from Doppler Weather Radars to Threat Emulators. Much like superheroes, these radars are playing crucial roles in various sectors and domains.HFCL's Managing Director, Mahendra Nahata, has emphasised his company's commitment to innovation in the defence industry. Showing their seriousness in making top-notch technology in India, the company is putting a lot of resources into Raddef Private Limited.

DIGITAL COAST GUARD PROJECT: MINISTRY OF DEFENCE SIGNS ₹588 CRORE DEAL WITH TCIL

New Delhi: Aligned with the centre's strategic vision for digital armed forces, the Ministry of Defence sealed a contract with Telecommunications Consultants India Limited (TCIL) to boost India's digital armed forces, said the ministry on December 8. The contract worth Rs 588.68-crore aims to advance India's digital defence capabilities through the acquisition of the digital coast guard (DCG) project under the Buy (Indian) category.

Under the Indian Coast Guard (ICG), the DCG project initiative will chart a trajectory of technological advancement in the nation. The scope of the pan-India project extends to encompass the construction of an advanced "Data Centre", the establishment of a resilient "Disaster Recovery Data Centre", amplification of connectivity across ICG sites, and the development of an enterprise resource planning (ERP) system. According to an official, "the DCG project will unfold a comprehensive narrative of technological progression, encompassing the construction of an advanced Data Centre, the establishment of a robust Disaster Recovery Data Centre, amplification of connectivity across ICG sites, and the development of the ERP system."

Additionally, the project harnesses secured multiprotocol label switching (MPLS) and very small aperture terminal (VSAT) connectivity, positioning itself at the forefront of defence technology. This digitisation will streamline logistical processes for the ministry saving significant resources and time. The Indian Coast Guard's strategic Digital Armed Forces vision advances through a pivotal contract aligned with the Centre's objectives. This initiative encompasses an advanced Data Centre, robust Disaster Recovery, connectivity enhancement, and ERP system development. Employing secured technology, including MPLS/VSAT, it establishes a Tier-III Data Centre core. This nerve centre centralizes ICG application oversight, ensuring vigilant management of critical IT assets.

The project is anticipated to generate approximately one and a half lakh man-days over a five-year period, fostering active participation from diverse sectors of Indian industries, thus significantly contributing to the government's efforts to achieve 'Aatmanirbharta' (self-reliance) in Defence.

TATA BOEING AEROSPACE DELIVERS 250 AH-64 APACHE FUSELAGES, MANUFACTURED IN INDIA

Hyderabad: Tata Boeing Aerospace Limited (TBAL) has delivered the 250th fuselage for the AH-64 Apache attack helicopter from its state-of-the-art facility in Hyderabad. These fuselages are manufactured for customers around the world, including the US Army, and most recently, the six on order with the Indian Army. This milestone reflects TBAL's continuous dedication to bolstering India's defence capabilities and advancing the nation's indigenous manufacturing prowess. The joint venture between Boeing and Tata Advanced Systems Limited (TASL) employs over 900 engineers and technicians, leveraging cutting-edge robotics, automation, and advanced aerospace concepts in its manufacturing processes. TBAL's 14,000 sqm facility serves as a global sole source supplier for Apache fuselages, with over 90 percent of the parts used in the Apache aerostructure assemblies manufactured in India through more than 100 Micro, Small, and Medium Enterprises (MSME) suppliers.

AWEIL RESUMES PRODUCTION OF DHANUSH ARTILLERY GUNS

Nagpur: After a pause for want of a spare, the production of Dhanush, the Indian Bofors artillery guns, has resumed with the Advance Weapons and Equipment India Limited (AWEIL) planning to deliver 26 new howitzers to the Indian Army during this financial year. This will take the total number of Dhanush guns with the Army to 50. There is an order to supply 114 guns in all, media reports said. The Dhanush is made at the Gun Carriage Factory (GCF) at Jabalpur. The first batch of six guns was handed over by the GCF to the Army in April 2019.

The Army which has ordered 114 Dhanush artillery guns, and has one regiment operational already, is expecting to receive all the guns by 2026, according to defence sources. With focus on long-range and augmented firepower, the Army is also looking at vastly increasing the range of the Pinaka Multi-Rocket Launch Systems (MRLS) and the Defence Research Development Organisation (DRDO) is working on it. The Pralay surface-to-surface quasi-ballistic missile too is in advanced stages of induction, sources said.

"One regiment that was equipped with Dhanush was operationalised only last year. There has been slight delay due to some imported components, among others... All that has stabilised. By 2026, Army should be getting balance regiments," a defence source said.

Dhanush is a 155 mm, 45-calibre towed artillery gun with a range of 36 km, and it has demonstrated a range of 38 km with specialised ammunition. It is an upgrade of the existing 155 mm, 39-calibre Bofors FH 77 gun. The Advanced Weapons and Equipment India Limited, carved after corporatisation of the Ordnance Factory Board, now manufacturing the Dhanush guns has a team on site and is working with the Army, sources stated.

Meanwhile, the war in Ukraine has underscored the importance of long-range firepower, both precision as well as saturation, and MRLS have proven to be decisive, sources noted. In this regard, the indigenous Pinaka Rocket System developed by the DRDO has been a success story for the Army, the source noted.

BEL BAGS ORDERS WORTH RS 2,759.15 CRORE

Bengaluru: Defence PSU Bharat Electronics Limited (BEL) announced December 22 that it has received orders worth Rs 2,673 crore from Goa Shipyard Limited (Value: Rs 1,701 crore) and Garden Reach Shipbuilders & Engineers (Value: Rs 972 crore) for supply of 14 types of sensors for use on Next Generation Offshore Patrol Vessels (NGOPV). This will have the participation of electronics and associated industries including MSMEs, which are sub-vendors of BEL. The equipment manufactured by BEL are part of the 'Aatmanirbhar Bharat' programme. In addition, the company has also received additional orders worth Rs 86.15 crore since the last disclosure on December 15, 2023, and the said orders pertain to miscellaneous Spares & Services. With the above, BEL has bagged cumulative orders of worth Rs 25,935.15 crore till now in the current financial year.

2024 MOON MISSION: FOUR IAF PILOTS SELECTED AS ASTRONAUT-DESIGNATE

New Delhi: Four test pilots from the Indian Air Force have been selected as Astronaut-Designates for the 2024 moon mission. The Indian Space Research Organisation (ISRO) is charting a bold course towards lunar exploration, with the aim of landing the first Indian astronaut on the moon by 2040. The announcement by ISRO Chairman S. Somanath has sparked a new wave of excitement in India's space science community. Following the resounding success of Chandrayaan-3, ISRO is intensifying its focus on human spaceflight. The Gaganyaan programme, a critical part of this endeavour, plans to launch a crew of 2-3 Indian astronauts into Low Earth Orbit (LEO) for up to three days, with a planned safe return to Indian waters. This mission is seen as a stepping stone to the lunar landing.

Four Indian Air Force test pilots have been selected as astronaut-designates for this ambitious mission. They are currently undergoing specialised training at the Astronaut Training Facility in Bangalore. This rigorous preparation is a testament to India's commitment to its space aspirations. The key to the Gaganyaan mission is the development of critical technologies such as a human-rated launch vehicle and an Orbital Module comprising a Crew Module and Service Module. The mission will be preceded by two uncrewed missions and various tests, including the successful Test Vehicle flight launched on October 21, 2023, which demonstrated crucial safety measures. Apart from lunar missions, ISRO is making strides in solar exploration with Aditya L1, India's first solar mission. Launched in September 2023, this mission will study the sun from Lagrange Point 1 and is expected to yield significant insights over its five-year mission.

Chandrayaan-3's success, leading to the declaration of 'National Space Day in India', has set a high benchmark in lunar exploration. The mission has provided valuable lunar data, detecting various elements in the lunar soil.

ISRO's roadmap includes the Small Satellite Launch Vehicle (SSLV), the Reusable Launch Vehicle (RLV) program, XPOSAT, the Space Docking Experiment (SPADEX), and the development of LOX-Methane engines. These initiatives are pivotal in advancing India's space technology and exploration capabilities.

NEWS ROUND UP

INDIA JOINS THE ELITE CLUB, ACHIEVES MILESTONE IN AUTONOMOUS FLYING WING TECHNOLOGY

New Delhi: Taking a significant leap towards advancing its aerial capabilities, India recently conducted a pivotal flight trial of its indigenous high-speed flying wing UAV, termed the Autonomous Flying Wing Technology Demonstrator. With this, India joins the elite club of countries to have mastered the controls for flying wing technology in tailless configuration. The successful flight trial of the Autonomous Flying Wing Technology Demonstrator at the Aeronautical Test Range, Chitradurga in Karnataka demonstrated maturity in the technology readiness levels in the country and marks a notable milestone in India's technological prowess. The Defence Research and Development Organisation (DRDO) spearheaded this achievement through its Aeronautical Development Establishment (ADE) in Bengaluru.

The journey to this feat commenced in July 2022 with maiden flight of the aircraft, followed by series of six flight trials in various developmental configurations using two in-house manufactured prototypes. These flight-tests led to achievements in development of robust aerodynamic and control systems; integrated real-time and hardware-in-loop simulation, and state-of-the-art Ground Control Station. The team had optimised the avionic systems, integration and flight operations towards the successful seventh flight in final configuration. The aircraft prototype, with a complex arrowhead wing platform, is designed and manufactured with light-weight carbon prepreg composite material developed indigenously. Notably, the aircraft's design, featuring a complex arrowhead wing platform signifies a pivotal moment in India's self-reliance in aerospace technology. Also, the composite structure, which has fibre interrogators for health monitoring, is a showcase of 'Aatmanirbharta' in aerospace technology.

The autonomous landing of the high-speed UAV was one of the most striking capabilities demonstrated. This achievement, accomplished without the need for ground radars/infrastructure/pilot, showcased a unique capability demonstration, allowing take-off and landing from any runway with surveyed coordinates. This was possible using onboard sensor data fusion with indigenous satellite-based augmentation using GPS Aided GEO Augmented Navigation (GAGAN) receivers to improve the accuracy and integrity of GPS navigation.

BIG ORDERS: MINISTRY OF DEFENCE SIGNS CONTRACT WITH MAZAGON DOCK, COCHIN SHIPYARD

New Delhi: The Ministry of Defence signed a contract worth Rs 1614.89 crore with Mazagon Dockyard Shipbuilders Ltd on December 20 for construction and delivery of six Next Generation Offshore Patrol Vessels (NGOPVs) for the Indian Coast Guard (ICG). The contract was made under the Buy (Indian-IDDM) category. Out of the six vessels being procured, four would replace the existing aging OPVs and the other two would augment the ICG fleet. The acquisition of these major ICG platforms is aimed to boost the ICG's capability and reinforces the increased focus of the Government towards Maritime Security. These modern and high-tech Ships will play a critical role in enhancing surveillance, Law enforcement, Search and Rescue, Maritime Pollution Response, and other important capabilities including humanitarian assistance by the ICG. Along with several high-tech advanced features and equipment, these 115m OPVS would be equipped with Multipurpose Drones, AI capability, and Wirelessly Controlled Remote Water Rescue Craft Lifebuoy, etc. enabling greater flexibility and operational edge to the ICG to face new age multidimensional challenges.

These multi-role state-of-the-art vessels will be indigenously designed, developed, and manufactured by MDL, Mumbai, and will be delivered in a total period of 66 months. The contract achieves the objectives of 'Aatmanirbhar Bharat' to boost the nation's indigenous shipbuilding capability, bolstering maritime economic activities and fostering the growth of ancillary industries, especially the MSME sector. The project will also generate employment opportunities and expertise development in the country. Another government-owned firm, Cochin Shipyard Limited in a press release said it has signed a Rs 488.25 crore contract with the Ministry of Defence for repair and maintenance of equipment and systems onboard naval vessels. "The work on the contract has already commenced during Q2FY24 based on the approval of necessity (AoN) from the Ministry of Defence, and is expected to be completed by Q1FY25," the company said. Cochin Shipyard, earlier this month, signed a memorandum of understanding (MoU) with the Adani Group for constructing green tugs, after delivering the first of the two tugs ordered by Ocean Sparkle Limited, now owned by Adani Harbour Services Limited. This is the first tug to be built in India under the Approved Standard Tug Design Specifications (ASTDS) issued by the Ministry of Ports, Shipping, and Waterways (MoPSW) for promoting the shipbuilding industry under the Aatmanirbhar Bharat initiative.

SPIRIT AERONAUTICAL SYSTEMS, GARUDA AEROSPACE FORGE STRATEGIC PARTNERSHIP FOR MUTUAL GROWTH AND INNOVATION

Athens / Mumbai: In a landmark development within the aerospace industry, Spirit Aeronautical Systems S.A., a leading Greek manufacturer specialising in rotary and fixed-wing weaponised drones, and Garuda Aerospace's Garuda Aerospace S.A., a prominent Indian manufacturer of drones for civil applications, have entered a strategic partnership through counter-signed contracts of cooperation. This collaboration is set to redefine the landscape of drone manufacturing and distribution, both in the Indian market and its wider area of influence as well as in Greece / Europe / Africa, but also in service provision, bringing together the unique strengths and expertise of both companies. The core objectives of this partnership include expanding market reach, fostering innovation, and facilitating the exchange of technology, experience, and best practices.

KEY HIGHLIGHTS OF THE PARTNERSHIP

Reseller Agreement: The companies have committed to acting as resellers for each other's products, amplifying their presence in diverse markets. This strategic move is expected to result in a synergistic effect, leveraging the strengths of each company's product portfolio.

Technology Transfer: Spirit Aeronautical Systems S.A. and Garuda Aerospace S.A. recognise the importance of technological advancement in the rapidly evolving drone industry. Both companies have agreed to actively exchange and transfer cutting-edge technology, facilitating the development of state-of-the-art products that meet the highest standards of quality and performance.

Experience Sharing: With a shared commitment to excellence, both companies will engage in a robust exchange of experiences and best practices. This collaborative approach aims to elevate the overall industry standards by combining the wealth of knowledge accumulated by Spirit Aeronautical Systems S.A. in weaponised drone manufacturing and Garuda Aerospace S.A.'s expertise in civil drone applications.

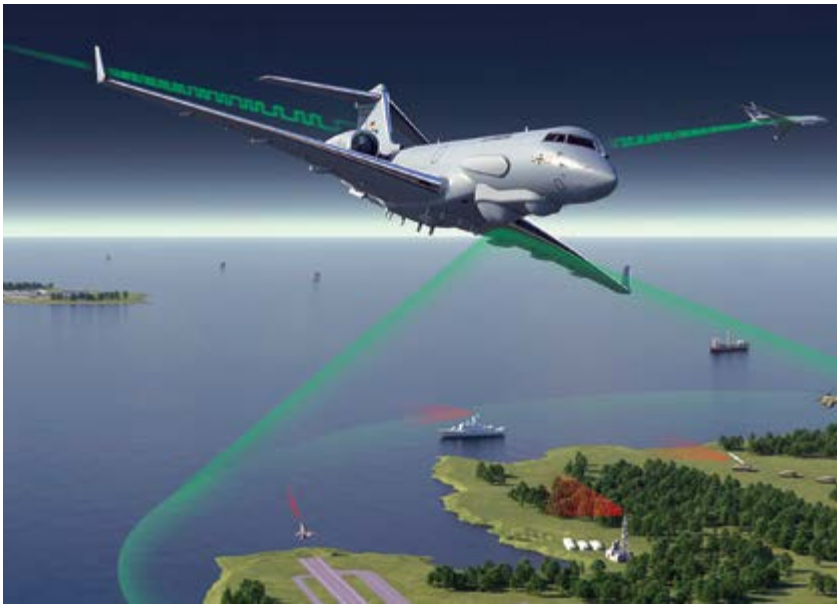
Quality Assurance: Recognising the significance of maintaining the highest level of quality in their products, both companies are unwavering in their commitment to delivering superior, reliable, and technologically advanced drones to their customers. This dedication to quality assurance is expected to set new benchmarks within the industry.

This pioneering collaboration between Spirit Aeronautical Systems S.A. and Garuda Aerospace S.A. exemplifies the spirit of cooperation and shared vision in the aerospace industry as well as the development of strategic synergies between the two countries. Both companies are poised to make a significant contribution to the Unmanned Systems market in general and not just drones, driving innovation and setting new standards of excellence.

BOEING-BUILT X-37B ORBITAL TEST VEHICLE EMBARKS ON SEVENTH MISSION

Kennedy Space Center, Florida. The Boeing built X-37B autonomous spaceplane launched yesterday aboard a SpaceX Falcon Heavy rocket, marking the beginning of its seventh mission. As it has with every mission, the Orbital Test Vehicle will validate new technologies, fostering innovation and pushing the boundaries of space exploration and utility. On this seventh flight, the X-37B will test future space domain awareness technology experiments that are integral in ensuring safe, stable and secure operations in space for all users of the domain. Since its inaugural launch in April 2010, the X-37B has consistently set new endurance records, surpassing the initial design mission duration of 270 days. Its sixth mission set a new record with an impressive 908-day journey before returning to Earth in November 2022. The X-37B, which will now build on its more than 1.3 billion miles traveled during its 3,774 days in space, exemplifies the successful partnership between the Department of the Air Force Rapid Capabilities Office and the United States Space Force. Boeing teams deliver program management, engineering, production, test and mission support. In 2019, the X-37B was awarded the Robert J. Collier Trophy for advancing the performance, efficiency and safety of air and space vehicles.

IN NEWS



PEGASUS SIGINT SYSTEM PICKS-UP SPEED

Taufkirchen/Germany. The PEGASUS signal intelligence (SIGINT) system is now entering the implementation phase with the design developed by sensor solution provider HENSOLDT.

The Federal Office of Bundeswehr Equipment, Information Technology and In-Service Support (BAAINBw) has approved one of the most important project milestones - the so-called Critical Design Review (CDR) - and thus given the green light for the implementation of the system design.

In the CDR, representatives of the Bundeswehr, both from the public customer and the future user, examined the design of the SIGINT components of the PEGASUS weapon system. In a large number of individual presentations, the customer was given a detailed presentation of the implementation planning for its extensive requirements. At the same time, the progress of the overall project was communicated in various software and hardware demonstrations.

Subsequently, the subcontractor Lufthansa Technik, Hamburg, gave an impressive presentation on the planned integration of the resulting reconnaissance system into the aircraft and the associated conversion measures.

Two years ago, HENSOLDT was awarded the contract to supply an airborne system for electronic signals intelligence on board Bombardier business jets based on its SIGINT system "Kalætron Integral". The order is worth over one billion euros. HENSOLDT is acting as general contractor and bears overall responsibility for the realisation of the project.

Lufthansa Technik, based in Hamburg, will act as a subcontractor, procuring the aircraft from the manufacturer Bombardier, including their modification, as well as fitting and integrating the reconnaissance system developed by HENSOLDT into the aircraft. In total, almost 30 companies, including many SMEs, from all over Germany are involved in the project as suppliers and partners.

EDGE AND UAE MINISTRY OF DEFENCE SEAL LANDMARK DEAL FOR MANSUP SYSTEMS

Dubai, UAE: The UAE Armed Forces have signed a Letter of Intent with EDGE Group, one of the world's leading advanced technology and defence groups, for the purchase of extended range MANSUP-ER and the shorter-range variant of the advanced anti-ship missile. The total value of the deal is AED 1.102 billion and follows another major order for the same systems placed by the Brazilian Navy at Dubai Airshow 2023. Co-developed with the Brazilian Navy, and Brazilian Smart Weapons and High-Tech System specialist, SIATT, in which EDGE has a 50% shareholding, the MANSUP-ER systems have been developed to meet the defence requirements of both the UAE Navy, the Brazilian Navy's Frigate programme, and for international export. EDGE is currently in advanced discussions with a number of potential customers for the long-range surface-to-surface missile, which features adaptive sea-skimming capabilities, has a range of 200 km, and is fitted with inertial guidance and active radar homing.

EDGE AND LEONARDO COLLABORATE FOR SYSTEMS INTEGRATION IN AIRBORNE AND NAVAL DOMAINS

Dubai, UAE: EDGE, one of the world's leading advanced technology and defence groups, and Leonardo Electronic Division, part of the Italian-headquartered global technology company, signed a Memorandum of Understanding (MoU) at the Dubai Airshow 2023 to explore joint opportunities related to subsystems, system integration and service support programmes for both airborne and naval domains. Leveraging their complementary strengths and capabilities, EDGE and Leonardo will explore potential collaboration which will advance their positions in the UAE and selected export markets.

GARUDA AEROSPACE SECURES 2ND TYPE CERTIFICATE FROM DGCA FOR MEDIUM CATEGORY DRONES

New Delhi: Garuda Aerospace, India's leading drone manufacturer, has secured its second Type Certificate from DGCA for Medium Category Drones. Continuing to solidify its position as an industry trailblazer, this development showcases Garuda Aerospace's dedication to pioneering advancements in UAV technology, reinforcing its commitment to meeting stringent regulatory standards. This certification acknowledges the technological prowess and reliability of Garuda Aerospace's medium category drone, showcasing its compliance with rigorous regulatory requirements. This Certification reflects Garuda Aerospace's dedication to engineering excellence, stringent safety protocols, and adherence to the highest industry standards. Backed by former Indian Cricket team captain MS Dhoni as an investor, Garuda Aerospace has been at the forefront of innovation. Prime Minister Narendra Modi's inauguration of 100 Kisan drones across 100 villages stands as a testament to Garuda Aerospace's commitment to empowering farmers and entrepreneurs, marking a remarkable leap forward in leveraging drone technology for societal advancement. Garuda Aerospace has recently secured a funding of INR 25 Crore.

BOEING DELIVERS FIRST ORCA EXTRA LARGE UNCREWED UNDERSEA VEHICLE TO US NAVY

HUNTINGTON BEACH, California. Boeing has delivered the first Orca Extra Large Uncrewed Undersea Vehicle (XLUUV) to the U.S Navy following acceptance testing completion this month. The XLUUV, designated by the Navy as "Orca," is a new class of autonomous submarine that can perform long duration critical missions to achieve undersea maritime dominance in changing environments and contested waters.

With the partnership of the Navy, Orca has undergone several phases of at-sea testing, including above and below surface maneuvers to demonstrate the vehicles' unique capabilities.

Orca is the result of more than 50 years of Boeing experience building and operating undersea vehicles. In 2012 Boeing initiated the design and development of Echo Voyager, a proof-of-concept XLUUV that began at-sea testing began in 2017 and was a precursor to the US Navy's Orca XLUUV competition. Echo Voyager – the world's only vehicle of its size and capability – has spent over 10,000 hours operating at sea and transited hundreds of nautical miles autonomously.

SPRINT PROGRAM: DARPA AWARDS CONTRACTS TO FOUR COMPANIES FOR EXPERIMENTAL HIGH-SPEED VERTICAL TAKEOFF AND LANDING X-PLANE

Washington: The US Defence Advanced Research Projects Agency (DARPA) is working with four companies to design an experimental vertical-takeoff-and-landing aircraft that can fly at speeds far faster than the V-22 Osprey. The collaboration comes as the US military considers how it might operate aircraft in areas that lack traditional runways. DARPA calls its program SPRINT, for Speed and Runway Independent Technologies. In November, the agency awarded contracts to Aurora Flight Sciences, Bell Textron, Northrop Grumman and Piasecki Aircraft Corp. to start honing their ideas. The total value for these four deals, which cover the initial phase, could be worth $15 million to $20 million, depending on what options the agency exercises. By spring of 2027, DARPA wants one of those companies to have finished designing and prototyping their aircraft, built it, and carried out its first flight. By spring of 2027, DARPA wants one of those companies to have finished designing and prototyping their aircraft, built it, and carried out its first flight. Navy Cmdr. Ian Higgins, SPRINT's program manager, said in an interview that speed is one of the key requirements for this aircraft. When the SPRINT aircraft flies forward, DARPA wants it to reach speeds between 400 and 450 knots, or about 460 to 520 mph. The V-22 Osprey has a maximum speed of 270 knots. "What we want to be able to achieve is higher-end speeds," Higgins said. "We're going another 100-plus knots beyond [the Osprey], which itself challenges physics if you were just to use the propulsion system that's in the Osprey."

IN NEWS

RAYTHEON PROTOTYPING DIRECTED-ENERGY ZAPPERS FOR DEFEND PROGRAM

Washington: The US Air Force and the US Navy have tapped Raytheon to design, build and test systems that fry electronic components with blasts of energy. The company, a division of the rebranded RTX, plans to deliver prototypes for the Directed Energy Front-Line Electromagnetic Neutralisation and Defeat program, or DEFEND, in fiscal 2024 and 2026.

Work on the high-power microwave antenna systems, as the company described them in an announcement earlier this month, is already underway in Tucson, Arizona. Its DEFEND contract is worth $31.3 million over three years.

The Pentagon is spending an average $1 billion annually to develop directed-energy weapons, with the goal of deploying them aboard aircraft, warships and ground vehicles to bat down drones and missiles. High-power microwave equipment, specifically, works by unleashing waves of energy that overwhelm the internal circuitry of weapons, rendering them useless.

Raytheon said its prototypes will be rugged and transportable for front-line use against "airborne threats." The company previously worked on the Counter-Electronic High Power Microwave Extended Range Air Base Defence, known as CHIMERA, for the Air Force. Overseas, Raytheon UK announced earlier this year it would install another type of directed-energy weapon, a high-energy laser, onto a Wolfhound armoured vehicle.

RTX is the second largest contractor in the world when ranked by defence revenue with the company earning $39.6 billion in 2022.

UTTAR PRADESH DEFENCE CORRIDOR GAINING MOMENTUM, 138 MoUs ALREADY SIGNED

New Delhi: In a significant development, the proposed defence corridor in Uttar Pradesh is gaining momentum alongside the industrial corridor. The finalised proposal for the defence corridor involves an investment of approximately Rs 25,000 crore. Various multinational companies have shown keen interest in investing in Jhansi, Lucknow, and Aligarh. As of now, 138 MoUs have been signed across the six nodes in the state. Defence corridors are being developed in six districts: Aligarh, Jhansi, Kanpur, Agra, Chitrakoot and Lucknow. The acquisition of 5,000 hectares of land has been undertaken for this purpose, with nearly 1,700 hectares already allocated to investors.

Senior officials of the Uttar Pradesh Defence Corridor Authority (UPDCA) said that the acquired land in Aligarh has been allocated to investors. Simultaneously, land acquisition for the second phase is underway in Kanpur and Lucknow. Notably, Jhansi has witnessed increased interest from major companies, particularly following the entry of Bharat Dynamics Ltd.

Several international companies have expressed interest in MoUs for the defence corridor. Notable entities such as Adani Defence and Aerospace, Anchor Research Lab, Genesys, Cell, EMITECH, BrahMos Aerospace, Tata Technologies, Optic Electronics India, Bharat Dynamics Ltd, L&T, Delta Combat, Hans Energy, SpiceJet Technologies, Varivin Defence, BEML, HAL, Gliders India, IIT Kanpur, IIT BHU, and DRDO are among those involved in agreements with the UPDCA.

MoD SIGNS Rs 802 CRORE CONTRACTS WITH JUPITER WAGONS, BEML FOR MILITARY EQUIPMENT

New Delhi: Two contracts worth Rs 802 crore were signed by the Ministry of Defence on January 4 for the procurement of military equipment with Jupiter Wagons and Bharat Earth Movers Limited (BEML).

Under the contract, procurement of Qty-697 Bogie Open Military (BOM) Wagons at a cost of Rs 473 crore with Jupiter Wagons and procurement of Qty-56 Mechanical Minefield Marking Equipment (MMME) Mark II worth Rs 329 crore with BEML Ltd, under Buy (Indian-IDDM) category will take place.

The defence ministry in a statement said that the BOM Wagons and MMME will be produced with equipment and sub-system sourced from indigenous manufacturers, giving a boost to the indigenous manufacturing and participation of the private sector in defence production, realising the vision of Atmanirbhar Bharat.

Designed by Research Design and Standard Organisation (RDSO), Bogie Open Military (BOM) wagons are specialist wagons used by the Indian Army for mobilisation of the Army units. BOM wagons are used to transport light vehicles, Artillery Guns, BMPs, Engineering Equipment etc. from their peacetime locations to operational areas. This Critical Rolling Stock will ensure speedy and simultaneous induction of units and equipment into operational areas during any conflict situation besides, facilitating their peacetime movement for Military exercise and movement of units from one station to another.

MMME has been designed to operate cross country with complete load of stores and carry out marking of minefields with minimal time and manpower employment. The equipment is based on an in-service High Mobility Vehicle having advanced mechanical and electrical systems which will reduce the timings for minefield marking during operations and will enhance the operational capability of Indian Army. Marking of all minefields is a mandatory requirement as per amended Protocol-II on Convention in certain Conventional Weapons to which India is a signatory.

HAL'S NEW DESIGN AND TEST FACILITY FOR AERO ENGINE R&D INAUGURATED BY DEFENCE SECRETARY

Bengaluru: A new design and test facility at the Hindustan Aeronautics Limited's (HAL) Aero Engine Research and Development Centre (AERDC), Bengaluru was inaugurated on December 29 by Defence Secretary Giridhar Aramane. Currently involved in the design and development of several new engines, including two strategic engines — Hindustan Turbo Fan Engine (HTFE) of 25 kN thrust for powering trainers, UAVs, twin-engine small fighter aircraft or regional jets, and Hindustan Turbo Shaft Engine (HTSE) of 1200 kN thrust for powering light and medium weight helicopters (3.5 to 6.5 tonnes in single or twin engine configuration), the AERDC's new state-of-the-art facility houses special machines, advanced setups leveraging computational tools, in-house fabrication facility, and two test beds for testing HTFE-25, and one test bed each for HTSE-1200 and upcoming JV engine for IMRH to be co-developed by Safran of France and HAL.

Additionally, the newly developed facility has setups for testing air producer of Jaguar, Gas Turbine Starter Unit (GTSU) - 110 M2 and 127E of LCA, Auxiliary Power Units of IMRH and AMCA, Gas Turbine Electrical Generator (GTEG) - 60 for AN 32 aircraft. Setups to carry out various critical tests for engine components. Line Replaceable Units (LRUs) have also been established within the new facility. Spanning over 10,000 sq. metres, the new facility has been established under a modernisation plan. The Centre, established in the 1960s, holds the unique distinction of being the only design house that has developed test beds for engines of both Western and Russian origin.

IN NEWS

BIG BOOST FOR DEFENCE EXPORTS, INDIA TO EXPORT AKASH ANTI-AIR SYSTEM TO ARMENIA

New Delhi: India is set to export its indigenous anti-air system to Armenia and further strengthen its trade relations with the Asian country. This deal adds to the growing list of defence exports, including multi-barrel rocket launchers, artillery guns, ammunition, and drones. Recently, India successfully showcased the Akash missile system's capability to engage four aerial targets simultaneously at a range of 25 kilometers. According to media reports quoting sources, Bharat Dynamics Limited (BDL) will manufacture and deliver the Akash anti-air systems as part of an estimated Rs 6,000-crore deal. The deliveries are expected to commence soon. The Akash system is already being used by the Indian Armed Forces and is also being offered for export to Vietnam and the Philippines. In April, the defence ministry had mentioned an undisclosed export order for the anti-air system. However, the receiving nation was not disclosed. Furthermore, in March, the Army had procured two additional regiments of the air defence system in a deal worth Rs 8,160 crore. The improved version of the Akash system, designed and developed by the Defence Research and Development Organisation, boasts a reduced footprint, 360° Engagement Capability, and advanced seekers. The system has an indigenous content of 82%, with 60% of the project cost awarded to the private industry, including MSMEs, to maintain a strong supply chain. In November last year, Kalyani Strategic Systems had announced a $155 million deal with an undisclosed overseas customer for artillery guns. It was later revealed that the order was also for Armenia. Recently, India successfully showcased the Akash missile system's capability to engage four aerial targets simultaneously at a range of 25 kilometers, according to DRDO. This accomplishment marks India as the first country to achieve such proficiency using a single firing unit. The Akash, boasting a range of up to 25 km, serves as a short-range surface-to-air missile, primarily safeguarding vulnerable areas and strategic points from potential air threats.

USER TRIALS OF INDIGENOUSLY DEVELOPED VSHORADS EXPECTED BY MID-2024

New Delhi: The user trials of indigenous developed very short-range air defence system (VSHORADS) to neutralise low-altitude aerial threats within a 6 km range, is expected by April-May 2024. According to a senior defence official, the 4th generation VSHORADS surpasses existing MANPADS in the Indian armed forces due to its state-of-the-art uncooled imaging infrared seeker. The success of the indigenous VSHORADS in user trials could mark a significant milestone in bolstering India's air defence capabilities.

Designed to eliminate hostile aircraft, drones, and helicopters at very short ranges, this development of India gearing up to commence 'user trials' for its indigenous man-portable air defence missile system, comes as the armed forces are currently inducting a limited number of Russian systems to address operational gaps in the ongoing military standoff with China in eastern Ladakh, stated a media report.

In January 2023, the defence acquisitions council, led by Rajnath Singh, approved the procurement of DRDO developed VSHORADS missiles at a cost of Rs 1,920 crore. The VSHORADS, with proven upper-range capabilities through developmental tests, is now set for crucial user trials before potential bulk production. Simultaneously, under the "Make-II" category project, funded by the industry for prototype development, Indian companies are exploring the development of "laser-beam riding VSHORADS".

The armed forces view VSHORADS as a low-cost option for swift deployment, offering close air defence protection in rugged high-altitude areas and the maritime domain. VSHORADS with their operational versatility and utility during the Russia-Ukraine war have proven itself to be an cost-effective option.

Initiated in June 2009, the procurement process saw the selection of Russian Igla-S anti-aircraft missile system. As the initial off-the-shelf purchase followed by technology transfer to Bharat Dynamics for subsequent production did not materialise, as a temporary solution, the Army and IAF resorted to emergency procurement of Igla-S MANPADS over the past three years. The latest contract which was signed in May 2023, included 100 Igla-S missiles and 48 launchers. The Igla-S variant boasts an improved interception range of up to 6 km.

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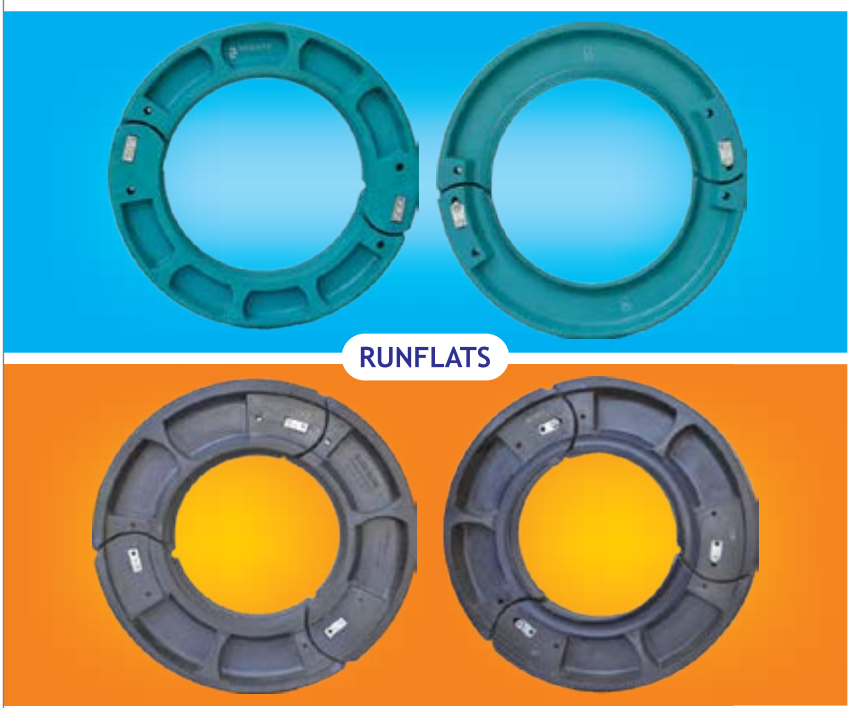

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