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## DefenseNews



# EDITORIAL

**Maj Gen Ravi Arora**

# A Stronger Navy Emerging Through Atmanirbharta

Indian Navy is pursuing a total of 38 Make projects under Chapter III of DAP 2020. Presently, 26 projects are being steered under Make-II category, 10 projects under Make I category and two projects under Make III Category. In addition, Eight Make II joint projects are being steered with IA and IAF as lead services. Under Make II, approvals have been given for 12 projects. In order to introduce cutting edge technology on board IN platforms, 25 projects are being pursued under the 'Technology Development Fund' scheme.

A wide range of niche technologies are being inducted to enhance long range precision attack capabilities. Loitering munitions in land and sea-based versions are being inducted to enhance the targeting capabilities. Additionally, containerised missile systems are being inducted to enhance the operational capability and to augment flexibility in operations.

The Navy has transformed from a 'Buyers Navy' into a 'Builders Navy', with aircraft carrier, destroyers, stealth frigates, corvettes, submarines and other war vessels being constructed in our country. Today, of the 66 ships under construction 64 are being built in India. Further, approvals have been given for 24 ships and submarines that are all planned to be constructed in Indian Shipyards. At present, IN has achieved approximately 90% indigenisation in the float segment, 60% in the move segment, and 50% in the fight segment. Indian Navy is committed to becoming a fully Aatmanirbhar Navy by 2047.

A number of ships and submarines have been commissioned in 2023.

- INS Vagir, fifth Submarine of Kalvari class, was commissioned on January 23, 2023.
- INS Tarmugli returned by the Govt of Maldives was re-commissioned after refit on December 14, 2023.
- INS Imphal, the third stealth ship of Project-15B was commissioned on 26 December 2023.
- Sandhayak (Yard 3025), the first of the four Survey Vessel (Large) ships was delivered to Indian Navy by GRSE on December 4, 2023.
- The third GRSE ship of Project P17A Frigates, Vindhyagiri (Yard 3024), was launched on Aug 17, 2023 at GRSE.
- The fourth ship of Survey Vessel Large, i.e. Sanshodhak (Yard 3028) was launched on June 13, 2023 at L&T Shipyard.
- Two ASW Shallow Water Craft (ASW SWC) namely Androth (Yard 3035) and Anjadip (Yard 3030) were launched on March 21 and June 13, 2023 respectively at GRSE.
- Three more ASW SWC namely Mahe (Yard 523), Malvan (Yard 524) and Magrol (Yard 525) were concurrently launched on November 30, 2023 at CSL, Kochi.
- The last of the seven P17A ships, i.e. Mahendragiri (Yard 12654) was launched on September 1, 2023 at MDL, Mumbai.
- 1st Diving Support Craft A-20 (Yard-325) was launched on August 31, 2023 at Titagarh Rail Systems Ltd, Kolkata.
- INS Vikrant completed Initial Operational Clearance (IOC) on May 31, 2023. With the IOC, the ship has proven the Aviation Facilities Complex, achieved day and night landing of MiG-29K, completed landing trials of all helicopters in the Naval inventory.

**Adm R Hari Kumar, PVSM, AVSM, VSM, ADC, Chief of the Navy Staff**

- Atmanirbharta in Defence is having a profound affect on the operational efficiency of the Indian Navy. During 2023 alone, a number of approvals were given by the Defence Acquisition Council (DAC). These included:
- Medium-Range Anti-Ship Missiles for surface platforms in November 2023.
- Next Generation Survey Vessels and avionic upgradation of Dornier aircraft in September 2023.
- 26 Rafale-Marine aircraft along with associated ancillary equipment, weapons, simulator, spares, documentation, crew training and logistic support in July 2023.
- 15 MQ-9B Sea Guardian High Altitude Long Endurance (HALE) Remotely Piloted Aircraft Systems (RPAs) in June 2023.
- Ship-launched BrahMos missiles and Utility Helicopters-Maritime in March 2023
- Brahmos Launcher and Fire Control System for the Shivalik class of ships and Next Generation Missile Vessels in January 2023.

The Ministry of Defence signed contracts with a number of companies to strengthen the capabilities of the Indian Navy. Among them were:

- 13 Lynx-U2 Fire Control Systems from Bharat Electronics Limited (BEL).
- Three Cadet Training Ships from Larsen & Toubro Limited (L&T).
- 11 Next Generation Offshore Patrol Vessels and six Next Generation Missile Vessels from different Indian shipyards.
- Five Fleet Support Ships (FSS) from Hindustan Shipyard Limited.
- 16 Upgraded Super Rapid Gun Mount (SRGM) anti-missile/anti-aircraft point defence weapon system from Bharat Heavy Electricals Limited.
- Medium Refit with Life Certification of Sub-Surface Killer Class of Submarine 'INS Shankush' with Mazagon Dock Shipbuilders.

## Navy Day Press Intercation

# Navy Chief Recounts Operational Readiness

**Maj Gen Deepak K Mehta**

Indian Navy Chief Admiral R Hari Kumar addressed a press conference ahead of the Navy Day celebrations, in New Delhi on 1 December 2023. He said that the task of the Indian Navy is to protect, preserve, promote, and pursue Bharat's national interest in the maritime domain, wherever they lie. He asserted that India is the resident power in the Indian Ocean region, notwithstanding the growing Chinese presence in the area.

He said as India's maritime interests and investments grow, it will mandate expansion in the Navy's responsibilities and operational footprint to protect these interests.

Adm R Hari Kumar, PVSM, AVSM, VSM, ADC, Chief of the Navy Staff

**Operational Readiness**

In terms of operational readiness, he said, "Our 'Mission Based Deployment' philosophy has enhanced the Indian Navy's presence across the region, enabling rapid responses to emerging security challenges. The Indian Navy has established a persistent footprint in our areas of interest. Naval deployments also serve as a deterrent to inimical interests, clearly signalling the Navy's reach, capability and intent."

**Maritime Surveillance**

"The oceans are considered to be a common heritage; they can be used for the legitimate economic aspirations of any nation. So in that regard, if you look at China, it may have a legitimate reason to be present in the Indian Ocean region for economic activities. But we, as the resident naval power in the Indian Ocean, keep an eye on what all is happening there," the Naval chief said.

"We try to keep the extra regional forces that are present in the region under surveillance and keep a watch on their activities–what are they engaged in, what are their intentions and so on. So, that is why we deploy our surveillance assets–ships, submarines, aircraft, UAVs and others. So they're deployed regularly to keep our area of interest and observation."

"Our interests are there in the Indian Ocean region and beyond when you look at the Indo-Pacific. So our ships, submarines, and aircraft are deployed accordingly. We try to keep our area of interest under surveillance," he said.

Admiral Kumar also talked about the naval air surveillance part and said that, looking at the surveillance aspect, each of the platforms comes with a particular type of capability.

"When you talk of the P-8I, while it has a secondary role for surveillance, it is essentially a submarine warfare aircraft. It is basically an asset that is meant to detect localised and targeted submarines. But when it is not engaged in the task, it can also be used for surveillance."

He also mentioned numerous other primary assets for surveillance but he stated that when an entire ocean area is looked upon, assets with different capabilities will be required. So we have to divide the area that we want to keep under surveillance with different types of assets.

> **"Navy's ships, submarines, and aircraft have sustained a high operational tempo and have undertaken missions and tasks encompassing military, diplomatic, constabulary and benign roles."**

**Chinese Forays in the Indian Ocean**

Speaking about increasing Chinese forays into the Indian Ocean Region, Adm Kumar said China may have legitimate reason to be present in the IOR for economic activities. "We keep an eye on what all is happening there. We try to maintain surveillance of the extra

regional forces present in this region and would like to know what activities they are engaged in and their intentions," he said.

He said the Navy's ships, submarines, and aircraft have sustained a high operational tempo and have undertaken missions and tasks encompassing military, diplomatic, constabulary and benign roles, adding that naval units were on mission-based deployments across the IOR and beyond to protect and promote India's national interests.

He said there are disputes in the Indo-Pacific which have the possibility of turning into conflicts and there are challenges such as IUU fishing, drug trafficking, piracy, illegal migration and robbery and it is important that dialogues continue to maintain peace and tranquillity in the Indo-Pacific.

Regarding the India-China standoff in Ladakh, he said, "Security situation on India's northern borders has added to our security complexities."

**India-US Partnership**

Admiral Kumar also said India has a long-standing partnership with the US and both countries have participated in a range of exercises, including Malabar, which began in 1993 and over the years have turned into a complex multilateral exercise, and other defence agreements signed between the two countries.

He said the Indian Navy and the US Navy have reached a high level of interoperability in joint exercises involving ships, submarines, aircraft and aircraft carriers.

In the last year, both sides have signed an agreement to develop underwater domain awareness and there is also enhanced cooperation between the two sides on technology, Admiral Kumar said, highlighting Indian shipyards' growing capabilities in shipbuilding and repairs and India procuring MQ9B drones from the US.

**"There are disputes in the Indo-Pacific which have the possibility of turning into conflicts and there are challenges such as IUU fishing, drug trafficking, piracy, illegal migration and robbery and it is important that dialogues continue to maintain peace and tranquility in the Indo-Pacific."**

**Ties with Maldives**

Maldives President Dr Mohamed Muizzu had formally sought withdrawal of Indian military personnel from Maldives during a meeting with Minister of Earth Sciences Kiren Rijiju, in late November.

On cooperation with Maldives, Adm Kumar, said that India has close cooperation with Maldives and any decision to scale down Indian military personnel presence from the key island nation will be based on instructions from the Central Government. "As far as scaling down of personnel is concerned, it is a decision of the government. Whatever instructions are given to us, we will follow," he said, emphasising New Delhi's close ties with the country in spheres of training as well as Maldives' participation in important events organised recently by the Navy such as the Goa Maritime Conclave and the Indo-Pacific Regional Dialogue.

He said that India has "a few assets" deployed in Maldives, adding that India has assisted the country in multiple ways over the last five years, including carrying out over 500 medical evacuations, and helping the country with surveillance to detect illegal activities in the maritime domain.

Maldives is among the key maritime neighbours of India in the Indian Ocean Region (IOR) and India has been seeking to expand ties with the island nation — including in areas of defence and security — amid China's efforts to expand its influence in the region. In May, both countries had launched the construction of a harbour for the Coast Guard of the Maldives National Defence Force (MNDF).

**Naval Ex-Servicemen in Qatari Prison**

To a question on the status of the eight former Naval personnel in Qatar, Admiral Kumar said the government is making extensive efforts to repatriate them. "We are working closely to ensure that their interests are looked after. The government of India is putting all-out efforts to ensure they are brought back," he said.

The former Navy personnel were given death sentence by Qatar's Court of First Instance on October 26, following which an appeal has already been filed against the death sentence, which has been admitted by a higher court in Qatar. The charges in the case have not been made public.

**Atmanirbharta**

Admiral Kumar said the Navy has made a univocal commitment to be fully "atmanirbhar" by 2047 in capabilities, capacities and concepts, while stating that the Navy is committed to greater jointness between the defence forces.

According to the Chief, the Navy's commitment to 'Aatmanirbharta' will be


**Chief of the Naval Staff Adm R Hari Kumar addressing a press conference at Kota House on the occasion of Navy Day, 1 Dec 2023.**

**Chief of the Naval Staff Adm R Hari Kumar releasing naval history books in 10 regional languages during the Navy Day press conference, 1 Dec 2023.**

reinforced by indigenisation of major equipment and systems through multiple avenues including the flagship 'Make in India' campaign. "We will continue with our sustained efforts to support the national initiatives such as Digital India, Skill India, Startup India and other GoI initiatives," he said.

He briefly spoke about all these initiatives and the role that the navy is playing to support these. Regarding Start-Up India, he said that the navy in the past year had 'supported, funded and hand-held more than 35 start-ups and Micro, Small and Medium Enterprises (MSMEs) for various projects towards developing niche technologies or products for the Navy.' Last year, the Navy facilitated employment of 88 personnel to these MSMEs. Memorandums of Understanding (MoUs) have recently been concluded with two companies through which close to 100 personnel are pursuing their second career options.

**Op Samudra Setu**

Regarding the navy's efforts to combat Covid, he said that the Indian Navy had played a role of 'care-giver' during the pandemic. Listing the efforts, he said that 10 naval ships, under the aegis of Operation Samudra Setu II, transhipped more than 1100 Metric Tons of Liquid Medical Oxygen to India. "Missions Sagar III to VII," he said, "reiterated India's commitment to the region, as IN ships and aircrafts provided COVID assistance to eight friendly foreign countries across the oceans through deployment of Naval medical teams, medicines, vaccines and humanitarian aid." He added that despite the disruptive impact of the pandemic, the navy had maintained its operational readiness and tempo through prompt implementation of preventive protocols. Our focus on maintaining combat and mission readiness resulted in deterring any misadventure in the maritime domain, while contributing to the national COVID effort—both internally and across the seas."

**"The navy in the past year had 'supported, funded and hand-held more than 35 start-ups and Micro, Small and Medium Enterprises (MSMEs) for various projects towards developing niche technologies or products for the Navy. "**

**Organisational Reforms**

Speaking about the reforms in defence, the chief of naval staff said, "I would like to reiterate the navy's wholehearted support for reforms in our Higher Defence Organisation, and on enhancing tri-service synergy. We are looking at establishment of the 'Maritime Theatre Command' in the near future, which would further buttress 'Joint planning and Joint application of force' in the maritime domain. The details are being worked out and may be finalised by the mid of next year."

**Women Agniveers**

Adm Kumar said that more than 1,000 women 'Agniveers' have been incorporated into the force. He lauded the Agnipath scheme and said its implementation has been a much-needed, transformational change.

"Our first batch of 'Agniveers' graduated from the premier-winning establishment, INS Chilka, in March this year. And importantly, this batch of Agniveers includes 272 female Agniveer trainees as well," Admiral Kumar said.

"And going further, the second batch of 'Agniveers' had a total of 454 women and I want to say that with the third batch, which has just been inducted, we have now crossed over 1000 women affiliates in the navy," he added.

Admiral Kumar asserted that these statistics stand testament to the Indian Navy's philosophy of all roles and all ranks with regard to the deployment of women in the service, both for officers and for personnel below the rank of officer.

"We also appointed the first woman commanding officer of an Indian naval ship. It has been our effort to constantly challenge the status quo to ensure that the navy remains on an aspirational and dynamic trajectory into the future," said Admiral Kumar.

"We have taken measures towards providing additional opportunities for women officers in the Navy. Women officers have been appointed on-board almost all major warships." Briefly touching upon recent developments in consonance with the government of India's objective to empower women, Admiral Kumar said, "We have taken measures towards providing additional opportunities for women officers in the Navy. Women officers have been appointed on-board almost all major warships, the first woman Provost officer joined the specialization in March this year, and induction of women officers into the Information Technology Branch will commence from June next year."

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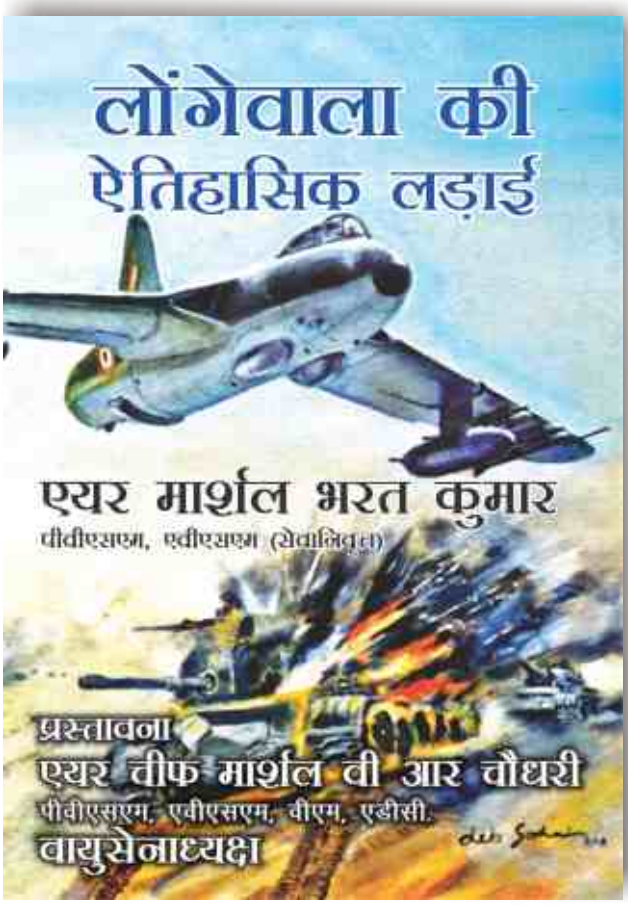


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लोंगेवाला की लड़ाई में भारतीय वायु सेना के तथ्यात्मक प्रदर्शन को सामने लाने की दिशा में यह पुस्तक एक महत्वपूर्ण कदम है। इस लड़ाई का मीडिया कवरेज तथ्यात्मक रूप से गलत सूचना पर आधारित है, जिसके कारण वायु सेना के प्रदर्शन को ठीक तरह से प्रस्तुत नहीं किया गया है।

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लोंगेवाला की लड़ाई की सफलता का श्रेय उसके एक शानदार बेस कमांडर, एयर मार्शल एमएस बावा और नंबर 122 स्क्वाड्रन के अत्यधिक प्रेरित और कुशल पायलटों को जाता है। उनका प्रदर्शन भारतीय वायु सेना के इतिहास में एक सुनहरा पृष्ठ बन गया है और आनेवाली पीढ़ियों को हमेशा प्रेरित करेगा।

*एयर चीफ़ मार्शल निर्मल चंद्र सूरी,* PVSM, AVSM, VM, *(सेवानिवृत्त)*

# Authored by a Scholar-Soldier

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# Indian Navy Adds Assets

**IMR Reporter**

**INS Tarmugli Commissioned**

Indian Navy commissioned INS Tarmugli, a Fast Attack Craft (FAC), under the aegis of the Eastern Naval Command, at Naval Dockyard, Visakhapatnam on December 14, 2023.

The ship, a Trinkat Class FAC boasts of a remarkable history and began its service as INS Tillanchang. Operating actively until 2006, as part of India's diplomatic outreach in the Indian Ocean Region (IOR), the ship was gifted to the Maldives National Defence Force (MNDF) and assumed the name MCGS Huravee. From April 16, 2006, until its decommissioning in May 2023, MCGS Huravee served under the MNDF flag. Upon its return to the Indian Navy, the ship underwent an extensive six-month refurbishment and upgrade at Naval Dockyard, Visakhapatnam.

Fitted with MTU engines, the latest communication equipment, a 30 mm gun and an advanced Radar system, the warship will be extensively used for coastal surveillance and protection of ODAs (Offshore Development Area) in the KG Basin area along the East Coast of India.

The 46-metre ship, named after a picturesque island in the Andaman group, displaces 320-tonne and can achieve speeds in excess of 30 knots. INS Tarmugli is tailored for tasks such as intercepting swift surface vessels, executing Anti-Smuggling operations, ensuring Fishery Protection, and conducting Search & Rescue Operations.

**'Mahe, Malvan and Mangrol' SWC Launched**

Mahe, Malvan and Mangrol, the first three ships of 08 x ASW Shallow Water Craft (CSL) project being built by CSL, Kochi for the Indian Navy, were launched on November 30, 2023 at CSL, Kochi.

The Mahe class ASW Shallow Water Crafts have been named after ports of strategic importance along the coast of India, and will look to carry forward the glorious legacy of the erstwhile minesweepers which were their namesake.

The contract for building eight ASW SWC ships was signed between the Ministry of Defence and Cochin Shipyard Limited on April 30, 2019. The Mahe class of ships will be equipped with indigenously developed, state-of-the-art underwater sensors, and are envisaged to undertake anti-submarine operations in coastal waters as well as Low Intensity Maritime Operations (LIMO) and Mine Laying Operations.


**INS Tarmugli, a Fast Attack Craft was recommissioned on 14 December 2023.**

> **"The ASW SWC ships are 78 m long and displacement is approx 900 tons, with a maximum speed of 25 knots. The first ship of the project is planned to be delivered in 2024."**

The ASW SWC ships are 78 m long and displacement is approx 900 tons, with a maximum speed of 25 knots.

The first ship of the project is planned to be delivered in 2024. The ASW SWC ships will have over 80% indigenous content, thereby ensuring that large scale defence production is executed by Indian manufacturing units, generating employment and capability enhancement within the country.

**Third Missile Cum Ammunition Barge Delivered**

The Indian Navy, on 22 November, took delivery of the third 'Missile Cum Ammunition Barge, LSAM 9 (Yard 77)', built by MSME Shipyard, SECON Engineering Projects Pvt Ltd, at Naval Dockyard, Visakhapatnam, for INS Tunir.

The contract for building 08 x Missile Cum Ammunition Barge was signed between MoD and SECON Engineering Projects Pvt Ltd, Visakhapatnam on February 19, 2021. Induction of these Barges would provide impetus to operational commitments of Indian Navy by facilitating Transportation, Embarkation and Disembarkation of articles and ammunition to IN Ships both alongside jetties and at outer harbours.

These Barges are indigenously designed and built under relevant Naval Rules and

Regulations of Indian Register of Shipping (IRS). The model testing of the Barge during design stage was undertaken at Naval Science and Technological Laboratory (NSTL), Visakhapatnam.

**Proposals to Acquire C-295 Transport Aircraft**

The Indian Coast Guard and the Navy are looking forward to acquire 15 C-295 transport aircraft that are being manufactured in India in a joint venture between Tata Advanced Systems and Airbus. The proposals for the acquisition of these 15 aircraft – nine planes would be procured by the Navy and six would be taken by the Indian Coast Guard are at an advanced stage in the defence ministry.

The C-295 transport aircraft would be equipped with the required radars and sensors and turned into a maritime patrol plane by the Defence Research and Development Organisation's Centre for Airborne Systems (CABS).

Recently, the first C-295 transport aircraft manufactured in Spain was inducted by the Indian Air Force. While the first 16 will come from Spain in fly-away condition, the remaining 40 will be produced in India at a Tata facility in Vadodara, Gujarat.

If approved by the government, the order from the Navy and Coast Guard will take the Tata Airbus order book to 71 from the existing 56. Some of the operators of the plane are using the C-295 transport aircraft in maritime patrol roles.

**Long Range Cruise Missile-Scalp for Rafale-M**

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.

In October, India submitted a letter of request (LoR) to French government to buy 26 Rafale-M fighter for INS Vikrant.

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.

**Missile Cum Ammunition Barge, LSAM 9 (Yard 77) was handed over to the Indian Navy on 22 Nov 2023.**

**"The Indian Coast Guard and the Navy are looking forward to acquire 15 C-295 transport aircraft being manufactured in India in a JV between Tata Advanced Systems and Airbus."**

**Indian Navy has proposed to procure nine C-295 transport aircraft and Coast Guard six planes.**

## Sea Guardians for Navy; Sky Guardians for IAF

# India to Purchase 31 U.S. HALE Drones

**IMR Reporter**

India will soon buy the efficient 31 MQ-9B Predator Drones for the Indian Navy and Indian Air Force in order to advance India's surveillance capability. This was confirmed by Chief of Naval Staff Adm R Hari Kumar on.... "The Predator MQ-9B drone is used for surveillance...This is a very useful asset...The government has given its approval to buy it now. There is a plan to buy 31 Predator Drones," said the Navy Chief.

The MQ-9Bs, which will be assembled in India, will enhance the Intelligence, Surveillance, and Reconnaissance (ISR) capabilities of India's armed forces across domains. As part of this plan, General Atomics will also establish a Comprehensive Global Maintenance, Repair and Overhaul (MRO) facility in India in support of India's long-term goals to boost indigenous defence capabilities.

According to a senior MoD official, India is negotiating to increase the indigenous content under the deal. "The current indigenous content proposed is 8-9% while India is hoping it can be increased up to 15-20%. Discussions are underway. General Atomics is positive to it and the US government has to accept it," the official said. General Atomics is in talks with several Indian companies for domestic manufacture of components as part of the deal, officials said. This could expand further to potentially include the manufacture of some electronics, sensor and avionics if the indigenous content goes up.

The MQ-9B has two variants — the SkyGuardian and the SeaGuardian, its maritime variant. The MQ-9B is designed to fly over the horizon via satellite for up to 40 hours, depending on configuration, in all types of weather and safely integrate into civil airspace, according to its manufacturer. For instance, the SeaGuardian configuration can include a 360-degree surface-search maritime radar, automatic identification system, sonobuoy monitoring system, and sonobuoy dispensers for persistent anti-surface and anti-submarine warfare missions.

31 MQ-9B drones being procured by the Indian Navy and Air Force will enhance ISR capabilities

**"The MQ-9Bs, which will be assembled in India, will enhance the ISR capabilities of India's armed forces across domains. As part of this plan, General Atomics will also establish a Comprehensive Global MRO facility in India."**

According to General Atomics, the MQ-9B can provide roughly 80% of the capability of a large human-flown maritime patrol aircraft at about 20% of its cost per hour. That makes it much more economical for navies to, for example, send out SeaGuardians to clear big volumes of air or sea and then, if anything of interest is discovered, vector in a human-crewed aircraft to save it the time, cost, and wear that it otherwise might have expended, the company stated. This is the primary reason the Indian Navy is keen on these UAVs as it significantly reduces the wear and tear on manned aircraft, its fleet of 12 P-8I long range maritime patrol aircraft, as well as reduce crew fatigue in keeping an eye over the wide

**In 2020, the Indian Navy leased two MQ-9B Sea Guardian drones from General Atomics for one year**

expanse of the Indian Ocean Region and beyond.

For the Army and Air Force, the MQ-9Bs can provide round-the-clock surveillance looking far beyond the borders, for instance on the movement of Chinese military build-up and troop movement along the Line of Actual Control (LAC) and deep inside. It also seamlessly integrates with other US-origin platforms that India operates, the P-8Is, AH-64 Apache attack helicopters, MH-60R multi-role helicopters among others expanding MQ-9B's multi-domain mission set.

**Deal Likely by March 2024**

On June 15, the Defence Acquisition Council headed by Singh accorded the Acceptance of Necessity (AoN) or initial approval for the acquisition of 31 MQ-9B drones from the US under the foreign military sale (FMS) route.

India is looking at sealing a landmark deal to procure 31 MQ-9B Predator armed drones from the US under a government-to-government framework by March, according to a news agency report. The report said that government officials from the two countries will hold the final series of negotiations on the procurement after Washington responds to India's Letter of Request (LoR) for the acquisition of drones from US defence major General Atomics (GA).

The procurement would cost around $3 billion as per estimates, though the price of the drones will be finalised during the negotiation process.

**"For the Army and Air Force, the MQ-9Bs can provide round-the-clock surveillance looking far beyond the borders, for instance on the movement of Chinese military build-up and troop movement along the LAC and deep inside."**

**About the Drones**

In 2020, the Indian Navy had taken on lease two MQ-9B Sea Guardian drones from General Atomics for a period of one year for surveillance in the Indian Ocean. The lease period has been extended subsequently.

The Sea Guardian drones can carry out a variety of roles, including maritime surveillance, anti-submarine warfare and over-the-horizon targeting and are being procured for the three services. While the Navy will get 15 Sea Guardian drones, the Indian Air Force and the Army will each get eight Sky Guardian drones.

Known for its high-altitude long-endurance, MQ-9B drones are capable of remaining airborne for over 35 hours and can carry four Hellfire missiles and around 450 kgs of bombs.

The Indian Navy plans to equip the Sea Guardians with sonobuoys, enhancing their ability to detect and track Chinese submarines in the Indian Ocean Region (IOR).

The drone can carry four SDS pods on its four wing pylons, allowing it to carry 40 'A' size or 80 'G' size sonobuoys, according to General Atomics. A sonobuoy is a small device used for underwater acoustic surveillance. It contains hydrophones that detect underwater sounds, especially those made by submarines. These devices are deployed from aircraft or ships and transmit real-time acoustic data, helping pin-point potential submarine threats. These systems, along with the P-8I long-range anti-submarine warfare aircraft, will enable the Navy to hunt Chinese and Pakistani submarines lurking deep in the IOR.

The Sea Guardian, with its 1,200 nautical mile range and significant on-station time, low maintenance, and low operating cost, can loiter over a designated area for a long time, deploying sonobuoys for locating submarines. After the detection of a submarine, the P-8I, with its high speed, can reach the designated area in a short period and drop torpedoes.

These drones also have the ability to patrol the entire IOR in one go, owing to their 30-hour endurance and 4,000 to 8,000-kilometre range.

The MQ-9 Predator drones saw action in Afghanistan, Iraq, Pakistan and Syria, where they were used for reconnaissance operations, close air support and for targeted killings. These drones were used for taking down high profile terrorists like Mullah Omar – the founder of the Taliban, and, Ayman Al-Zawahiri– the late emir of Al-Qaeda in Afghanistan.

The MQ-9B Predator is an upgraded and much more advanced version of the MQ-9 Predator. It is fitted with sophisticated surveillance facilities, bombs and armed with American made surface to ground – AGM-114 Hellfire missiles.

In the last few years, the India-US defence cooperation has been on an upswing. Prime Minister Narendra Modi and US President Joe Biden in their talks on the sidelines of the G20 summit in Delhi, vowed to "deepen and diversify" the bilateral major defence partnership while welcoming forward movement in India's procurement of 31 drones and joint development of jet engines. The US designated India a "Major Defence Partner" in June 2016, paving the way for sharing of critical military equipment and technology.

# Second Indigenous Aircraft Carrier Cleared

**IMR Reporter**

The Defence Procurement Board (DPB) has accorded in-principle approval to the Indian Navy's proposal for construction of a second aircraft carrier at a cost of around Rs 40,000 crore, signalling the government's readiness to go for the second indigenous aircraft carrier, to be known as IAC II.

The construction of IAC-II with a displacement of 45,000 tonnes with the envisaged specifications, was strongly being pushed by the Indian Navy. Having a three-carrier battle group is important for the Indian Navy as a show of strength. The Navy has been pitching for three aircraft carriers to deal with China's growing naval prowess and its growing influence over the Indian Ocean region.

The Navy currently has two aircraft carriers— the INS Vikramaditya (formerly the Russian Admiral Gorshkov) and the INS Vikrant, which was indigenously made. But keeping in mind the Chinese pressure in the Indian Ocean Region, the Navy is looking at a larger force. Three carriers also ensure that the Navy has two carriers at all times — one for the Arabian Sea and the other for the Bay of Bengal.

An enlarged fleet also gives India the flexibility to exert influence in the faraway seas with its presence.

**Indigenous Aircraft Carrier-II will be built at a cost of Rs 40,000 crore**

**Indigenous Aircraft Carrier-I**

INS Vikrant (IAC I), India's first indigenously-built aircraft carrier was commissioned in September 2023 by Prime Minister Narendra Modi. Built at a cost of around Rs 23,000 crore, INS Vikrant has a sophisticated air defence network and anti-ship missile systems. It has the capacity to hold 30 fighter jets and helicopters. At the commissioning ceremony of the vessel, Modi called it a "floating city" and that it is a reflection of India becoming self-reliant in defence.

INS Vikrant displacing 44,800 tonnes is powered by four General Electric LM2500 engines which give it a maximum speed of 28 knots and an endurance of 7,500 nautical miles. The ship uses an aircraft-operation mode known as Short Take Off But Arrested Recovery (STOBAR) for which it is equipped with a ski-jump for launching aircraft, and a set of three 'arrester wires' for their recovery onboard.

In addition, the Navy also operates the 44,500-tonne carrier INS Vikramaditya, which also employs the STOBAR mechanism, procured from Russia under a $2.3-billion deal and inducted in November 2013.

**Indigenous Aircraft Carrier-II**

According to the sources, the IAC II will be kind of a repeat order of the IAC I. According to the plan, the IAC II will be built by state-run Cochin Shipyard. At present, India has two aircraft carriers — INS Vikramaditya and INS Vikrant. INS Vikramaditya is a Russian origin platform. The INS Vikrant has over 2,300 compartments, designed for a crew of around 1700 people, including specialised cabins to accommodate women officers. INS Vikrant has a top speed of around 28 knots and a cruising speed of 18 knots with an endurance of about 7,500 nautical miles.

Once the Cabinet clearance is accorded, the carrier will be with the Navy in 7-10 years.

The Navy had envisaged an IAC-2 with a displacement of 65,000 tonnes and a Catapult Assisted Take Off But Arrested Recovery (CATOBAR) system for launching aircraft as well as full-electric propulsion. However, a much bigger carrier with newer technologies would mean much higher cost and build time due to which the Navy has settled for a repeat of a Vikrant-sized carrier.

**Three-Carrier Navy**

For long the Navy has based its force structure centred around three carriers, The Parliamentary Standing Committee on Defence had noted that three aircraft carriers is an "unavoidable requirement" to meet any eventualities. It stated that taking into account the long coastline and hostile adversities on both sides of Indian peninsula, an aircraft carrier on both sides of coast is "quintessential" to uphold operational requirements.

# Indo-Pacific Regional Dialogue 2023

**IMR Reporter**

The annual apex-level international conference of the Indian Navy – the Indo-Pacific Regional Dialogue (IPRD) – was held in New Delhi on 15-17 November 2023. The IPRD followed the Goa Maritime Conclave 2023, which had been conducted by the Indian Navy from 29 to 31 Oct 2023 in Goa.

While the Goa Maritime Conclave sought to project the Indian Navy's cooperative engagement at the strategic-operational level, by providing a forum for the Chiefs-of-Navy and Heads of Maritime Agencies in the Indian Ocean Region, the IPRD, on the other hand, was the principal manifestation of the Navy's international engagement at the strategic-level, addressing 'holistic' maritime security issues across the Indo-Pacific.

The first two editions of IPRD were held in 2018 and 2019 respectively at New Delhi. IPRD 2020 was cancelled due to the Covid-19 outbreak. The third edition of IPRD was held in 2021 in online mode and the fourth edition was conducted, reverting to a physical format, at New Delhi in 2022.

**Theme of IPRD-2023**

The overarching theme of IPRD-2023 was "Geopolitical Impacts upon Indo-Pacific Maritime Trade and Connectivity". This year's edition of the IPRD built upon the previous one, which focussed upon 'Operationalising the Indo-Pacific Oceans Initiative (IPOI)', by specifically addressing the 'Trade, Connectivity and Maritime Transport' pillar of the IPOI.

IPRD-2023 explored geopolitical impacts upon Indo-Pacific maritime trade and connectivity through six professional sessions spread over a three-day period.

The sessions were:

- Nodes of maritime connectivity;
- China's impact vis-à-vis maritime connectivity across the Indo-Pacific;
- Maritime connectivity through shipping and trade;
- Maritime connectivity through shipping and trade (Part 2);
- Private industry in the safety and security of Indo-Pacific maritime trade and shipping; and
- Maintaining a rules-based, safe, and secure Indo-Pacific.

Eminent speakers from 16 countries and representatives of the various embassies and high commissions attended and offered diverse regional perspectives on the subject.

**Navy Chief's Address**

Speaking at the Indo-Pacific Regional dialogue organised by the Indian Navy, navy chief Admiral R Hari Kumar said that violations of established rules pose a danger to good order at sea. He described the security situation in the South China Sea as "fragile." He warned that the region is the most militarised in the world and a "contestation" at sea can have adverse economic and social consequences.

"The fragile security situation in the South China Sea, in addition to the happenings of violations of established codes of conduct or confidence building measures, pose a clear and present danger to good order and discipline at sea," Admiral Kumar said.

The comments were a rare direct reference to the situation in the South China sea and come at a time when China and Pakistan are undertaking large-scale naval drills in the Arabian Sea.

He said that more than 50 warships of extra regional forces are deployed in the Indian Ocean Region on various missions, including anti-piracy patrols off the Gulf of Aden and the wider Indo-Pacific has a significant naval presence, which can lead to confrontation and contestation.

"Owing to the increased presence of multinational forces, and differing interpretations of international laws, there is this fear that the region's 'global commons' can change to 'contested seas'," he said. The navy chief added that this contestation at sea "can have adverse consequences for security-physical, social as well as economic".

Admiral Kumar made a case for greater collaboration between nations in the maritime nation. "We are traversing through a contested present into an uncertain future. The future of global commons hinges on cooperative efforts of nations," he said.

He said that cooperative or collaborative systems amongst like-minded maritime nations are essential for a stable future. He also made a strong case for developing interoperability and trust between nations, saying this requires a sustained and continued engagement.

**Chinese Threat**

China's People's Liberation Army Navy (PLAN) presents the greatest challenge to the Indian Navy in the Indo-Pacific region. The

**Adm R Hari Kumar, Chief of Naval Staff, addressing delegates at the Indo-Pacific Regional Dialogue**

PLAN is supported by the China Coast Guard and the Chinese maritime militia in furthering Chinese national interest in the Indo-Pacific region.

China's friendship with Pakistan is of concern as they together present a new challenge to India in the maritime domain. India considers the Indian Ocean region as the key to India's security and also aims to build credibility in the Indo-Pacific.

The dispute over Taiwan and China's aggressive posture in the South and East China Seas, and China's rivalry with America for dominance in those waters has brought the Indo-Pacific region centr-estage. China's 'grey zone' operations against US maritime forces and its allies have further sharpened rivalries in the Indo-Pacific.

**India's Linkages with the Indo-Pacific**

The Indian government has often enunciated a vision of a free, open, inclusive, and prosperous Indo-Pacific.

The Indo-Pacific is the gateway to the Indian Ocean from the east with crucial trade and security implications. Hence its is of vital interest to India as also to ASEAN countries. India has linkages with many countries of southeast Asia and east Asia. The Indian Navy has been exercising with navies of the ASEAN region for many years. The Malabar series of exercises include participation by the United States navy and Japanese Self Defence Forces. Ther Indian Navy has exercised not only in the Bay of Bengal but in the western Pacific as well.

**"The Indo-Pacific is now perceived as vital for energy security, maritime security, and maritime commerce. The Indian Navy is a formidable and potent force to provide such security in the region."**

India's 'Look East' policy was enunciated in the early 1990s, keeping in mind its maritime and security interests. The same has transformed into 'Act East' policy. In pursuit of this policy, the Indian Navy has engaged its counterparts in the Indo-Pacific by way of maritime military cooperation and humanitarian assistance and disaster relief.

Piracy, maritime terrorism, maritime crimes like drug and human trafficking, are some of the other threats which the Indian Navy has to be deal with. Other non-traditional threats include climate change-induced sea-level rise and maritime pollution. State actors in particular are challenging the rules-based, liberal international order and need to be dealt with.

**Indian Navy's Approach**

The Indian Navy provides maritime security for safe trade and monitors vessels that enter or leave the Indian Ocean region through the Malacca Strait, with the Andaman and Nicobar Command's undertaking regular surveillance. Coordinated naval patrols with Bangladesh, Thai and Indonesian navies have been institutionalised. Maritime partnership exercises are conducted with Singapore, Thailand, Indonesia, Malaysia and Myanmar, in bilateral or multilateral formats.

Indian naval ships, submarines and aircraft have undertaken long-range overseas deployments, across the Indo-Pacific as far as Japan, Hawaii and Australia.

Towards becoming a net security provider in the region, the Indian Navy has been helping smaller maritime neighbours and providing platforms and equipment for their navies. Neibhbours have appreciated India's help in training, repairs, expertise in hydrography, maritime surveys and cartographic assistance.

The Indian Navy is the first responder in the region for humanitarian assistance and disaster relief. In the aftermath of the 2004 tsunami, earthquakes, cyclones, and pandemics the Indian Navy's contribution with relief supplies with professionalism has created tremendous goodwill.

**Comments**

The Indo-Pacific region stretches from the coastlines of East Africa to the western Americas. It is today a vital oceanic space comprising critical choke-points that carry a majority of the world's trade. The choke-points are situated at key geopolitical flashpoints. The Indo-Pacific is now perceived as vital for energy security, maritime security, and maritime commerce. The Indian Navy is is a formidable and potent force to provide such security in the region.

The Indian Navy is preparing a 175-ship plan (25 ships more than its current strength of 150) to particularly deal with the Chinese threat in the Indian Ocean.

India has strategic partnership with the United States, Japan, South Korea, Australia, Southeast Asian countries, and West Asian countries. India is also involved in the Quadrilateral Security Dialogue (QUAD) featuring three partners in the US, Japan, and Australia.

The Indian Navy is playing an important role in realising the Indian government's vision of a free, open, inclusive, and prosperous Indo-Pacific.

# Army to Overhaul T-72s, Infantry Capabilities

**IMR Reporter**

**Overhaul of T-72 Tanks**

The Indian Army has issued a tender to support its program for the restoration and life extension of in-service T-72 main battle tanks (MBTs). According to a request for information (RFI) issued by the Indian Army on November 21, the program – named 'Overhaul II of Tank T-72' – is carried out to ensure restoration of the T-72 to "as good as new condition".

The program seeks to "neutralise effects of age, usage, and restoration of T-72 to near-zero hour [and] zero km state of operational readiness", the RFI said.

The T-72 restoration process comprises "stripping of the tank, removal of assemblies, stripping of the repairable assemblies, inspection of the components of repairable assemblies, and replacement of assemblies [that are not repairable] with new ones", the RFI added.

The process also includes "100% replacement of parts that have limited shelf life such as gaskets, seals, rings, bearings, fasteners, washers, and so on; testing of assemblies; integration in tanks; and quality assurance", the RFI said.

The program, according to the Indian Army, includes rectification of major/minor weld defects and worn-out portions of the T-72 hull; replacement or revalidation of rubber parts, metal pipes, and engine sub-assemblies; and replacement or revalidation of cooling, fuel, lubrication, air induction, exhaust, and transmission systems components.

**Indigenisation of Ammunition**

Rising conflicts globally have posed challenges and disrupted supply chains. The ongoing war in Ukraine and before that the Ladakh stand-off made it imperative that a clear road map for ammunition procurement and long –term requirement should be in place.

The efforts to secure supply chains and avoid any impact on operational preparedness has led to finalisation of the long-term requirement for a decade and a clear road map for ammunition procurement has been put in place. About 85% of the ammunition requirement has been indigenised, from both the public and private sectors.

The aim is to build up ammunition stocks to desired levels, minimise imports and achieve self-sufficiency in the country, have multiple sources of supply, and possess indigenous manufacturing capability. First step is to indigenise all import-dependent ammunition — major platforms with long-term requirement.

Indigenisation of more than 30 variants, amounting to about Rs 16,000 crores as part of import minimisation, is under way and five or six variants of ammunition have been identified for production through the Indian

The Army has issued a RFI for the overhaul of T-72 tanks

**"The T-72 restoration process comprises stripping of the tank, removal of assemblies, stripping of the repairable assemblies, inspection of the components of repairable assemblies, and replacement of assemblies with new ones."**

**The defence ministry has approved the procurement of 6,400 Pinaka rockets for Rs 2,800 crore.**

industry, which will expand the indigenous vendor base. Subsequently, next-generation high-tech ammunition based on research and development is being identified for in-house development.

Bulk of the ammunition is being met by the Defence Public Sector Undertakings (DPSUs) and the rest by the Indian industry. Less than 10% is met purely through direct imports and there is also some amount of legacy platforms in small numbers that are in the process of being phased out.

Under the three rounds of emergency financial powers granted by the Defence Ministry, the armed forces had undertaken major procurement and stocking of spares and ammunition. The fourth round of emergency procurement was completed recently and it ensured enough stocks of critical ammunition and also helped offset delays to some extent in deliveries of spares, components and ammunition since the war in Ukraine broke out in February 2022.

Most of the Indian Army's armoured fleet is of Russian-origin and the air defence has several legacy systems. Currently, about 10 to 12 ammunition categories in over 30 variants are being indigenised on priority and these are undergoing field trials.

With several Indian private companies now in the race to manufacture ammunition in the country, the ammunition stocking through indigenisation efforts will help Army's operational preparedness to meet future threats.

**Pinaka Rockets for Rs 2800 Crore Approved**

In a bid to augment the Indian Army's arsenal, the Defence Ministry has approved a Rs 2,800 crore proposal for buying around 6,400 of two types of rockets for Pinaka multi-barrel rocket launcher systems, designated as Area Denial Munition Type-2 and Type-3.

> **"Next-generation high-tech ammunition based on research and development is being identified for in-house development."**

The Indian Army will procure the rockets exclusively from indigenous sources and two main contenders include the Economic Explosives Limited of Solar Industries and the Munitions India Limited– a key ammunition-producer created by the corporatisation of the erstwhile Ordnance Factories.

The indigenous Pinaka weapon system has been developed by the Defence Research and Development Organisation. The weapon system is one of the first few Indian military systems exported to foreign nations, including Armenia. Private sector companies Larsen & Toubro, Tata Defence and Economic Explosives Limited involved in the project have set up production lines for the Pinaka system that are being supplied in bulk to the armed forces.

The army has a requirement of 22 regiments of the Pinaka MBRL as part of larger artillery modernisation plans. Pinaka regiments of the Indian Army include launchers with automated gun aiming and positioning systems and command posts.

**70,000 More Sig Sauer Assault Rifles**

The defence ministry has approved the purchase of more than 70,000 Sig Sauer assault rifles, giving its personnel a significant increase in firepower for use in terrorist operations and other missions.

The purchase of over 70,000 of Sig Sauer assault rifles is estimated to cost over Rs 800 crore. The military originally decided to purchase these rifles because it desired a weapon with a greater range. Among a number

**The defence ministry has approved the purchase of 70,000 Sig Sauer assault rifles for Rs 800 crore**

of contenders, the SiG 716 assault rifle was selected due to its superior calibre and longer range. Additionally, it is said to be more deadly than the AK-47 and its variations in the service, as well as the INSAS rifle.

In February 2019, 72,400 SiG 716 rifles (7.62 x 51mm calibre) were purchased from SIG Sauer of the US; 66,400 of them were for the Army, 4,000 for the Air Force, and 2,000 for the Navy. The American-made assault guns, which are being deployed by personnel in the Kashmir valley and the Ladakh section of the China border, have already resulted in over 70,000 indictments by India.

To improve its conventional and anti-terrorist capabilities, the Indian troops have also received a sizable quantity of Russian AK-103s. The AK-203, which is now being made at an ordnance facility in Amethi, will also soon be available to the Indian troops.

**The Army has issued a RFI for 10,000 Hand Held Thermal Imagers**

**Handheld Thermal Image Devices**

The Indian Army is in the process to induct around 10,000 Hand Held Thermal Imager-Uncooled (HHTI-UC) devices, for which the Request for Information (RFI) has been issued.

As per the RFI sought from the vendors, it requires the "HHTI-UC with latest technology parameters to enable soldiers to carry out surveillance up to 3,000 metres." The surveillance device should enable day and night surveillance with a combination of high-resolution optical viewer, digital (low light) and thermal (uncooled) sensors.

The surveillance device should facilitate judging distance of area under surveillance using laser range finders, acquisition of magnetic bearing using DMC and provide own location to users employing inbuilt satellite navigation systems, including NAVIC (Navigation with Indian Constellation).

The surveillance device should weigh less than 3 kgs and facilitate recording and storage of minimum three hours of SD videos with removable storage devices. It should also enable seamless wired or wireless connectivity of minimum up to 50 metres with standard interfaces.

Once the vendors respond to the RFI, "Tentative date of issue of Request for Proposal (RFP) is June 2024. The total quantity required is approximately 10,000," the RFI says. The procurement will be "in a phased manner, the desired quantity should be delivered within six months to twenty four months from the day of advance payment".

The vendors should confirm in their response their capability of delivering requisite quantity of HHTI-UC within the stipulated time frame. Vendors are expected to forward the required documents and details by December 26 this year, the RFI said.

As per the RFI sought from the vendors, it requires the "HHTI-UC with latest technology parameters to enable soldiers to carry out surveillance up to 3,000 metres". The surveillance device should facilitate judging distance of area under surveillance using laser range finders, it said.

**AI-Enabled Gun-Mounted Scope**

An indigenously-developed scope that can be fitted on any small weapon and turn it into a smart weapon is being tested by the Indian Army. The smart scope is powered by Artificial Intelligence that can detect humans up to 300 metres and also extensively boost border and close combat operations. Using AI algorithm and sensory data, it can tell the shooter when to fire. It had an 80-90% accuracy when tested for 100-300 metres

The smart scope is currently at its prototype stage, but a miniature version can be made too. The scope can help achieve one shot one hit capability and easily turn a soldier into a marksman. The scope first detects the target and makes a red bounding box, after which the camera checks for alignment using the laser and finder. Once the target box turns green, the shooter is alerted that he can fire.

The scope currently has only day firing capability, but it can be turned into night firing device too. The day camera has 50mm lens and 30X zoom.

# 100 More LCA Mark 1A Proposed by IAF

**IMR Reporter**

The Indian Air Force (IAF) officially announced its intention to procure about 100 additional Made-in-India Light Combat Aircraft (LCA) Mark 1A fighter jets, in Sep 2023. It's a significant move aimed at strengthening India's aerospace capabilities.

The announcement was made by Air Chief Marshal VR Chaudhari, the Chief of the IAF while receiving the first C-295 transport aircraft in Spain. He underscored the pivotal role of the LCA in replacing the ageing MiG-series fleet, which includes the MiG-21, MiG-23, and MiG-27 aircraft.

Air Chief Marshal Chaudhari said, "With the retirement of these ageing aircraft, it is imperative that we bolster our inventory with LCA class aircraft. Therefore, in addition to the 83 LCA Mark 1A aircraft we have already contracted for, we are advocating for the acquisition of around 100 more."

The objective in acquiring these domestically produced aircraft is to phase out the older MiG-series fighter jets in its fleet. The proposal has been formally submitted to the defence ministry and other national security stakeholders. This decision to procure approximately 100 more LCA Tejas fighters follows a comprehensive review meeting chaired by the Air Force Chief, which included key stakeholders in the indigenous fighter jet program, such as Hindustan Aeronautics Limited (HAL).

The order, if approved and realised, would represent a substantial expansion of the Indian Air Force's LCA Tejas fleet. Over the next 15 years, the IAF is expected to have 40 LCA Tejas, more than 180 LCA Mark-1A, and a minimum of 120 LCA Mark-2 aircraft in its inventory.

The LCA Mark 1A stands as an advanced iteration of the Tejas aircraft, featuring upgraded avionics and radar systems compared to the initial 40 LCAs supplied to the Air Force. The first deliveries of LCA Mark 1A is anticipated around February 2024. Boasting a substantial indigenous component of over 65 percent, the LCA Mark 1A reaffirms India's commitment to self-reliance in the aerospace sector. This program aligns seamlessly with the Atmanirbhar Bharat and Make in India initiatives, highlighting the nation's unwavering dedication to achieving self-sufficiency in aerospace technology and manufacturing.

The Indian Air Force has proposed the acquisition of 100 additioinal Tejas Mk1A LCAs.

**" The order, [for 100 LCAs] if approved and realised, would represent a substantial expansion of the IAF's LCA Tejas fleet. Over the next 15 years, the IAF is expected to have 40 LCA Tejas, more than 180 LCA Mark-1A, and a minimum of 120 LCA Mark-2 aircraft in its inventory."**

Earlier, in August 2023, after the fighter jet successfully fired the Astra indigenous Beyond Visual Range (BVR) air-to-air missile, the IAF chief held a review meeting of the indigenous fighter jet programme with all entities involved including the HAL.

The Air Chief brought out that the LCA has been the flag bearer of the IAF efforts towards indigenisation of its aircraft fleet. He said that given the nature of this project of national importance, it is required that all stakeholders adopt a collaborative approach towards its success. The programme has been the harbinger of Atmanirbhar Bharat and Make in India initiatives of the nation. More

**LCA Tejas Mk 1A with two ASRAAM missiles**

importantly, it is a flag bearer of India's self-reliance in the aerospace sector.

During the review, it was brought out that all contracted fighter variants of the LCA Mk 1 had been delivered to the IAF. Representatives of HAL had assured the chief of the timely delivery of the contracted twin-seaters in the coming months, as well. Further to the LCA Mk 1, 83 LCA Mk-1A aircraft have also been contracted by the IAF in 2021. The CMD of HAL had assured those present that the deliveries of this advanced variant of the LCA would commence by February 2024.

While complimenting HAL, the Air Chief indicated that based on these assurances, the LCA Mk 1A could be inducted in a newly raised squadron in one of the IAF's operational bases, early next year. Notwithstanding the project delays that were brought out during the course of the review, the CAS lauded the efforts of all stakeholders and emphasised on the need to incorporate the lessons learnt from the LCA programme into future indigenous design and developmental projects. With timely deliveries of the more capable variant, the LCA Mk 1A is likely to see increased deployments at forward bases, besides participation in International exercises in the days to come.

The order for 100 LCA Mark1A fighter jets would make way for fighter jets re-entry into the Indian Air Force in very large numbers. In the next 15 years, the IAF will have 40 LCA, over 180 LCA Mark-1A and at least 120 LCA Mark-2 planes. The last order for LCA Mark1A was for 83 aircraft and the first plane would be delivered around February 2024.

The advanced version of Tejas aircraft, LCA Mark 1A has more advanced avionics and radars than the initial 40 LCAs being supplied to the Air Force and will have more indigenous content. The LCA Tejas programme has been the harbinger of Atmanirbhar Bharat and Make in India initiatives of the nation. More importantly, it is a flag bearer of India's self-reliance in the aerospace sector as well as the force's efforts towards the indigenisation of its aircraft fleet.

**Parliamentary Panel's Concerns**

The Parliamentary Standing Committee on Defence report tabled in the House on --- has expressed 'concern' over the existing fighting force levels of the IAF.

The committee was informed by the MoD that delivery of Light Combat Aircraft Tejas MK-1A fighter aircraft will commence from February 2024 and complete by January 2029 and the case for procurement of 114 Multi-Role Fighter Aircraft (MRFA) is under progress.

Expressing their concern over the existing force level in the Air Force, the committee desired that "all-out efforts be made to expedite supply of Tejas". The committee urged the MoD to make a time-bound schedule. The committee noted that plan for theaterisation of armed forces, or creation of integrated theatre commands has been considered by the forces at the highest level.

**LCA Navy Trainer Prototype**

The LCA Naval trainer prototype NP5 successfully completed its maiden flight on August 18 from HAL airport.

Designed and developed jointly by ADA and HAL, LCA Navy can also serve as an effective training platform for Indian Navy pilots for operations from the aircraft carriers. Addition of NP5 aircraft to LCA Navy prototype fleet will help to accelerate flight testing activities which will provide designers vital inputs towards design and development of the Twin Engine Deck Based Fighter (TEDBF), the prestigious futuristic carrier aircraft programme of the country.

The new prototype NP5 will undertake field and carrier operations from both INS Vikramaditya and INS Vikrant, ADA said, adding it will incorporate all improvements identified during exploitation of NP1 and NP2 is a production ready aircraft. It will also incorporate the production standard airframe and rainwater compliance, maintainability improvements as well as futuristic system advancement.

The first trainer prototype NP1 was flown on April 27, 2012 and the fighter prototype NP2 was flown on February 7, 2015. Both Naval Prototypes (NP1 and NP2) have achieved major landmark milestones like Ski Jump take off and arrested landing demonstrations on Shore Based Test Facility (SBTF) at Dabolim Airport, Goa and operations from indigenous aircraft carriers. The aircraft demonstrated 18 arrested landings and Ski Jump take offs from INS Vikramaditya in January 2020, including hot refuelling capability. Recently, LCA Navy participated in the carrier trials from INS Vikrant and performed 10 Ski Jump take offs and arrested landings on February 6, 2023.

The LCA Navy is equipped with state-of-the-art technologies such as fly-by-wire flight control system, glass cockpit and advanced mechanical systems. The aircraft can be operated seamlessly both during the day and night. It features advanced hands free ski jump take-off and landing flight control modes. LCA Navy prototypes are carrier compatible and can operate with Air-to-Air weapons for combat missions.

**Twin-Seater Trainer Version Handed Over to IAF**

The IAF got its first Tejas twin-seater trainer version aircraft on October 4 from HAL. The twin-seater trainer version aircraft is part of the LCA Tejas project, the largest R&D program ever undertaken in India.

As part of the Tejas contract between the HAL and the Indian Air Force, the defence public sector unit has to supply eight twin-seater trainer aircraft to the force. HAL has an order for 18 twin-seaters from the IAF, with plans to deliver eight by the fiscal year 2023-24 and the remaining ten by 2026-27.

The LCA Tejas Twin Seater is a lightweight, all-weather multi-role 4.5 generation aircraft, featuring advanced technologies such as relaxed static stability, quadruplex fly-by-wire flight control, carefree manoeuvring, an advanced glass cockpit, integrated digital avionics systems, and advanced composite materials for the airframe.

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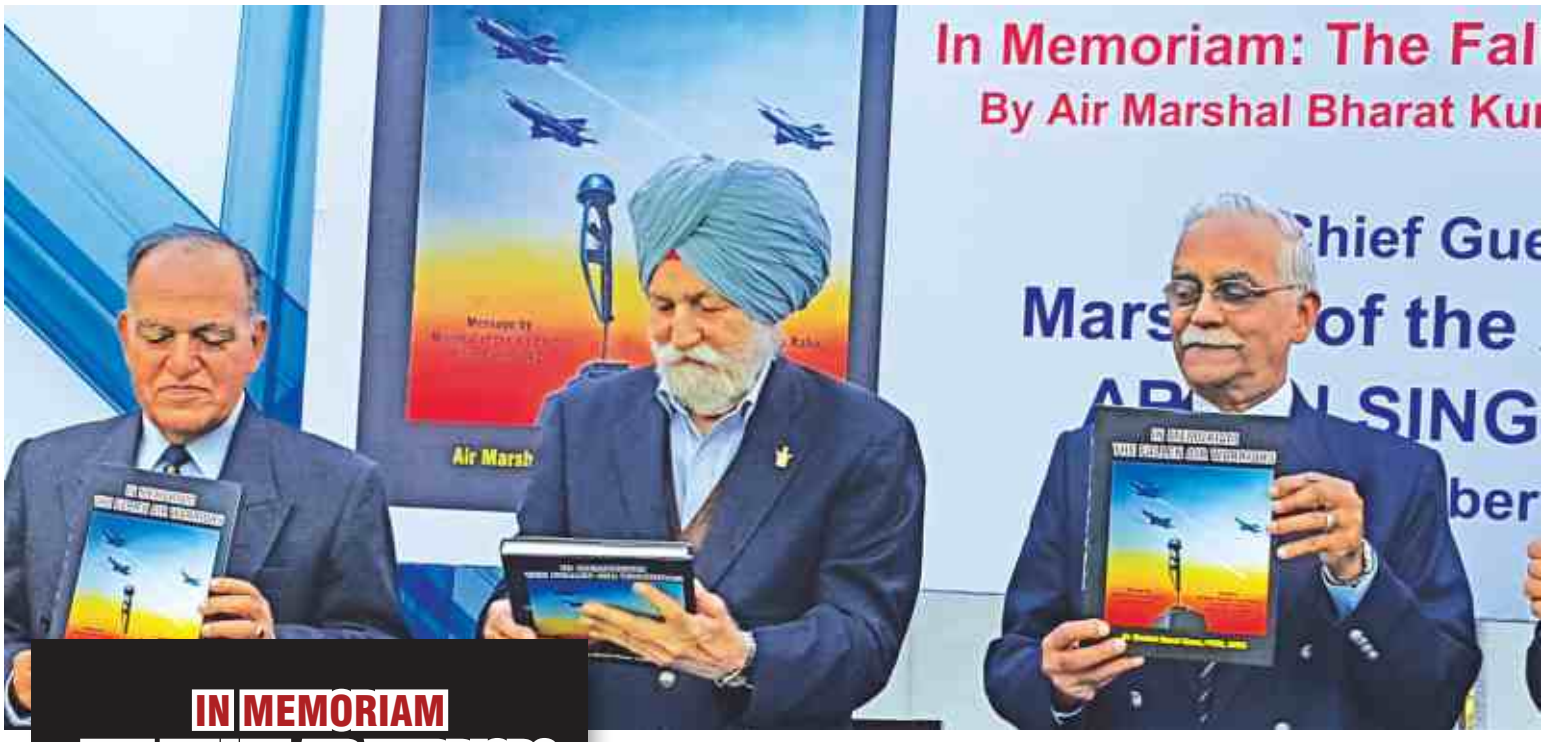



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Marshal of the Air Force Arjan Singh, DFC, releasing **In Memroiam: The Fallen Air Warriors** along with the author Air Marshal Bharat Kumar (left) and Lt Gen PK Singh, Director United Service Institution of India (right) on 15 December 2016

## Foreword by
## Air Chief Marshal Arup Raha, Chief of the Air Staff

### About the Book

This work is a chronicle of all aircrew killed either in accidents or during operations in the aircraft of the Indian Air Force. Details of air warriors from Army and Navy who died in IAF aircraft also find their place in this work. The chronicle includes the names of those Indian air warriors who perished while on deputation with other agencies like Indian Navy, Hindustan Aeronautics Limited, Aviation Research Centre, Helicopter Corporation of India and while serving with Royal Air Force or when undergoing flying courses abroad. This book has recorded all casualties that occurred right from the inception of the Indian Air Force, 8 October 1932, till 31 December 2012 – a span for the period of the first 80 years of the Indian Air Force.

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## Defence & Aerospace: 2023 in Review

# IAF Operations and Exercises

**IMR Special Report**

2023 saw the induction of major state-of-the-art systems, weapon platforms and missiles into the Indian Air Force. The IAF also exercised with the air forces of friendly foreign nations and carried out HADR operations as well as assistance to civil authorities.

**VVIP Ops by B-777 Aircraft:** IAF took over independent VVIP operations on B-777 ac wef 31 Mar 23. As a milestone achievement, IAF undertook nonstop flight from Delhi to New York with full cockpit complement by IAF and further on to Washington and Cairo. In addition to the aircrew, ground handling, catering uplift and engineering support services were also independently handled by IAF.

**Para Trials & Ops:** ADRDE is developing HDS for C-130J and C-17 aircraft under Technology Demonstration mode. Post CEMILAC certification and fitment trials, out of total eight trials sorties approved for HDS (12 Ft Platform), seventh HDS trial was conducted on 17 Oct 23 at Mahajan Field Firing Range (MFFR). Trial was successful and load landed safely at the designated landing point.

ADR & CRCC Trials from C-17 ac: Flight trials for Single/Twin ADR (Air Droppable Rigid Hull Inflatable Boat) and CRRC (Combat Rubberised Raiding Craft) were successfully completed on C-17 ac in the month of Sep 23, in coordination with Indian Navy and ISRO (Toroidal Buoy Equipment).

**Akash Missile System:** Three squadrons of Akash missile system, employing advanced Rajendra Mk-II radars has been commissioned in the last one year. Additional Akash Sqns are likely to be inducted by Dec 23.

**HERON MKII:** Heron Mk II RPA has been inducted and operationalised in Indian Air Force. The system is capable of undertaking SATCOM based operations along with advanced sensors and avionics suite. The payload is more capable and can locate targets in depth in enemy territory. The induction has boosted the IAF's capability to undertake ISR missions beyond Line of sight ranges at higher altitude of operations.

**On August 19, the Indian Air Force reported the successful testing of the new Heavy Drop System (HDS) from a C-17 Globemaster III cargo aircraft.**

**Bison (MiG 21 Upgrade) Drawdown Plan:** The drawdown plan has been approved and re-equipping of one operational squadron having this ac, with Su-30 MKI has commenced. Re-equipping of one more squadron with the ingenious Tejas LCA MK-IA, has been announced.

**Integration of Weapons:** The New Generation Close Combat Missile was fired for the first time this year. Long Range SCALP missiles were also fired and validated. Apache Attack Heptrs also carried out successful firing of Stinger Msl against an airborne slow moving target. IAF is working towards induction of indigenous Astra entire long range BVR missile, which is likely to commence shortly.

**Long Range Mission:** Long Range Missions were undertaken deep into the IOR. These missions were flown along multiple axes to cover the IAF's area of interest to control the sea and dominate the air space.

### Training and Exercises

The IAF continued to train hard this year exercising not only with sister services for enhancing jointness, but also with Air Forces of friendly foreign countries. Listed below are a few:

**Ex Veer Guardian-23:** Held in the period 12-27 Jan 23, this was the first air exercise between India and Japan.

**Ex PASSEX with France:** On 29 Jan 23, the IAF conducted 'Ex PASSEX' with French fighter aircraft sailing onboard the aircraft carrier 'Charles De Gaulle' in the IOR.

**Ex Desert Flag-8 in UAE:** IAF participated in 'Ex Desert Flag-8' in Al-Dhafra, UAE from 24 Feb-20 Mar 23. This was the first ever participation by the Tejas in an international air exercise.

**Ex Cobra Warrior-23:** IAF participated in multinational Air Exercise 'Ex Cobra Warrior-23' in UK from 06-24 Mar 23. This exercise saw IAF aircraft staging through Saudi Arabia for the first time.

**Ex Cope India-23:** The USAF and the IAF participated in 'Ex Cope India-23' at AFS Kalaikunda (fighters) and Panagarh (transport aircraft) from 10-21 Apr 23. The Japan Air & Self Defence Force participated with one observer.

**Ex Orion-23:** IAF participated in multinational exercise 'Ex Orion-23' in France from 17 Apr - 05 May 23. The exercise saw the IAF's Rafale aircraft ferrying directly from France to India.

**Ex INIOCHOS-23:** IAF participated in a multinational exercise 'Ex Iniochos-23' in Greece from 24 Apr - 05 May 23. This was the first Air Exercise between India and Greece.

**Ex Bright Star-23.** IAF took part in Ex Bright Star-23 with Egypt from 27 Aug -16 Sep 23. The IAF's MiG-29 fighters ferried directly from India to Egypt.

**Integrated Exercises and Joint Training**

The following training exercises were conducted with sister services, aimed at increasing joint capabilities:-

Ex Kranti Mahotsav from 08 May 23 to 10 May 23 with 01 MLH.

Exercise Ex Chakra Drishti-23 from 10 May 23 to 12 May 23 with Fighter, RPA and AEW&C.

IAF participated in EWT of 33 Armd, 16 Rapid, 6(I) Armd Bde and 47 Engr Bde from 08 May 23 to 27 May 23 wherein IAF's Helicopters operated along with IA.

Exercise Western Command Theatre Spl Ops validation from 10 to 25 May 23 and Helicopters along with Transport aircraft. It also witnessed RPA and fighter operations.

Exercise 2 Corps EWT on 23 – 24 May 23 with Su-30MKI.

Exercise Long range Maritime strike over Western seaboard on 02 Jun 23 with fighters, transport and AWACS.

**Humanitarian Assistance and Disaster Relief International HADR Ops.**

**Op Dost – HADR at Turkiye and Syria:** The Middle East nation of Turkiye and adjoining Syria were struck by a catastrophic earthquake on the morning of 6 Feb 23. The IAF was immediately alerted and a prompt aid and assistance was launched under 'Operation Dost'. The first C-17 aircraft got airborne from Hindan for Adana, Turkiye at the midnight of 7 Feb 23. Subsequently, four more C-17 aircraft followed suite, while one C-130J aircraft was tasked with 5.8 tons of medical load to Damascus, Syria. The operations continued with the final de-induction on 20 Feb 23. The IAF transport fleet flew 28 sorties (188 hrs) and carried 307 tons of load, of which 278 tons load was airlifted for Turkey and 29 T for Syria.

IAF C-17 flight carrying nearly 38 tonnes of relief material for Palestinians left on 22 Oct for El-Arish in Egypt.

**"First IAF C-17 aircraft was launched on 22 Oct 23 in support of Palestinian citizens affected by the ongoing Israel-Hamas conflict. IAF C-17 airlifted 6.5 tons of medical relief items and 32 tons of disaster relief material."**

**Op Kaveri – HADR at Sudan:** The break out of hostilities between Sudanese Armed Forces (SAF) and Rapid Support Force (RSF) in Sudan had resulted in stranding of approximately 4000 Indian nationals and PIOs. On extremely short notice, IAF air operations towards evacuation of Indian diaspora commenced on 19 Apr 23. C-130J and C-17 were tasked for the ops with Garud SF teams onboard, in the event of special ops if required. Initial rescue missions were flown from Jeddah to Port Sudan. Subsequently, on 27 Apr 23, in a daring night operation, IAF aircraft rescued 121 Indians from a small airstrip at Wadi Seyidna airport. While the crew used Electro Optical-Infra Red to evade obstructions and inimical forces, ERO (Engine Running Ops) plan was carried out when Garud commandos operated on ground. The total flying effort by the IAF was 22 sorties (115 hrs), airlifting 2100 passengers from Sudan to Jeddah and 915 passengers from Jeddah to India, in addition to 58 tons of critical load.

**Op Ajay (Israel – Hamas Conflict):** Towards Op Ajay, first IAF C-17 aircraft was launched on 22 Oct 23 in support of Palestinian citizens affected by the ongoing Israel-Hamas conflict. IAF C-17 airlifted 6.5 tons of medical relief items and 32 tons of disaster relief material including essential life-saving medicines, surgical items, tents, sleeping bags, tarpaulins, sanitary utilities and water purification tablets among other necessary items. The medical relief was delivered at Al-Arish, Egypt to the Red Crescent, for onward distribution in Gaza.

**HADR Ops – Nepal:** On 03 Nov 23, a devastating earthquake struck Nepal, resulting in heavy loss of life and property. Relief aid was planned to be inducted close to the affected areas in Nepal, resulting in operations on short runway airfields like Nepalganj. IAF C-130J aircraft inducted NDRF relief equipment and HLL medicinal payload at Nepalganj on 5-6 Nov 23. As a first responder, essential medical cum hygiene supplies, tents, and other relief materials were provided for earthquake affected families. The IAF C-130J aircraft undertook day/ night operations at Nepalganj, and flew 02 sorties, airlifting 21 tons of relief load.

**Domestic HADR Operations**

**HADR Ops – UT of Ladakh:** In Feb 23, IAF heptrs served as a vital link in the UT of Ladakh when the roads saw a heavy blockage due to snow activity. Heptrs sprang into operations on 15 Feb 23 for airlift of stranded passengers

from Zanskar to Leh. The task was carried out by Chinook and MI-17 1V helicopters wherein 200 passengers were airlifted.

**Disaster Relief Ops (Forest Fire) at Goa:** On 08 Mar 23 Govt of Goa requested IAF to provide aid towards dousing forest fires at far flung areas in the state. Mi-17 V5 helicopters deployed for the task undertook massive ops. In 20 sorties, the heptrs dispensed 1, 40,000 litres of water by 14 Mar 23.

**Disaster Relief Ops (Forest Fire) at Tamil Nadu:** On 15 Apr 23, Govt of Tamil Nadu requested IAF effort towards dousing forest fire in Madukkarai range of Coimbatore (Tamilnadu). MI-17 V5 helicopter deployed for the ops dispensed 22, 450 litres of water on 16 Apr 23.

**Disaster Relief Ops (Flood Relief) at Himachal Pradesh:** In response to damages caused by monsoon triggered cloud bursts, flash floods and landslides in Himachal, IAF deployed Mi-17 V5 and Cheetal helicopters. Rescue ops were carried out in Chandratall and Samundar Tapu Axis. IAF inserted disaster relief crew and air dropped ration, medicines and essential supplies. The relief operations which started on 11 Jul 23 continued till 30 Sep 23. 68 tons of relief material and 1355 citizens were airlifted in 275 sorties (138 hrs).

**Disaster Relief Ops (Flood Relief) at Ambala:** In the second week of Jul 23, several villages around Ambala (Punjab) were affected by severe floods. From 14 to 17 Jul 23, one Mi-17 helicopter was tasked towards disaster relief operation, which carried out airdrop of critical sustenance ration to the affected citizens. 10 sorties were flown airlifting 10 tons of relief material and 14 personnel.

**Disaster Relief Ops (Flood Relief) at Yavatmal:** On 22 Jul 23, one MI-17 V5 helicopter was launched from Raipur, which undertook five sorties towards rescue of villagers marooned in Yavatmal village of Maharashtra.

**Disaster Relief Ops (Flood Relief) at Telangana:** From 27 to 30 Jul 23, two Chetak helicopters were deployed at Warangal for flood relief operations. While the heptrs rescued seven personnel, 25 sorties (22 hrs) were flown towards the ops.

**Disaster Relief Ops (Flood Relief) at Sikkim:** Several districts of Sikkim were severely affected by the flash floods on 4 Oct 23. HADR operation centre was set up at Bagdogra. Helicopter were positioned as per the requirement projected by the State Govt. IAF deployed helicopters from almost all the fleets, including Chinook to undertake the disaster relief. The IAF helicopters undertook 287 sorties (125 hrs), airlifting 205 tons of load. 3027 personnel were evacuated by the helicopters, which included foreign nationals from Thailand, Belgium, Russia, Bangladesh and America.

**Tunnel Rescue Ops at Uttarakhand:** A portion of the under construction Silkyara tunnel in Uttarkashi district of Uttarakhand collapsed on 12 Nov 23 trapping 41 construction workers. On 15 Nov 23, IAF deployed three C-130J aircraft to airlift 27.5 tonnes of critical heavy equipment, rescue loads and rescue experts to Dharasu ALG that was not in use since 2013. Between 17 and27 Nov 23, heavy Augur machinery from Indore, DRDO robots from Pune and drill bit and metal wire load from Mumbai were airlifted to Dehradun. On 29 Nov 23, Chinook helicopter airlifted all 41 rescued workers to AIIMS Rishikesh. The tasks were successfully carried out with minimal notice utilising C-130, C-17, Dornier, AN-32 and Chinook. The IAF aircraft operated over 79 hours lifting 104 tons of load.

**Nation Building & Internal Security**

**Manipur situation:** On the directions from MoD, IAF deployed its transport and helicopter assets towards airlift and deployment of CRPF, BSF, Indian Army and Assam rifles teams with load from Hindan, Ranchi, Kolkata, Agartala, Kumbhigram, Guwahati and Mohanbari to Imphal to assist in containing the situation in Manipur. The ops by IAF which started on 23 May 23 continued till 25 Sep 23. 10,120 troops and 652 tons of relief material were airlifted in 605 sorties (399 hrs).

**Haryana situation:** IAF deployed C-130, C-17 and IL-76 aircraft for airlift and deployment of CRPF and RAF troops to contain the situation in Nuh, Haryana. Overnight operations (18 sorties/18.5 hrs) achieved airlift and deployment of 824 troops (with 58 tons load) from Jammu, Prayagraj and Hindan.

**G-20 Task:** IAF helicopters were extensively utilised for various operational tasks towards G-20 summit in September. The assets were utilised for ORP duties, DIADC duty, CASEVAC / Emergency response and NSG tasks.

**Elections-Chhattisgarh:** IAF was tasked to provide air effort to the election officials during the Chhattisgarh assembly elections held in November. IAF Mi-17 helicopters carried out 404 sorties amounting to 194 hrs of air effort. 1,707 personnel and 15 tons of load including polling parties and EVMs were airlifted.

**PM Kedarnath Redevelopment Project:** Since 31 Oct 22, IAF has tasked one Chinook helicopter on regular operations towards "PM Kedarnath redevelopment project". Till 31 Mar 23, under slung operations could result in airlift of 575 tons of load against the initial projected load of 500 tons. As on 12 Nov 23, 866 tons had been airlifted towards the project.

**RLV Trials:** IAF provided its helicopters to progress the scientific cause of ISRO. Chinook heptr flew 25 sorties towards ISRO RLV trials at Chitradurga for testing of load in under slung mode on 02 Apr 23.

**Digitisation**

**Dedication of e-MMS:** In line with the Government's initiatives for digital transformation, IAF has migrated to digital workflows for recording of maintenance activities through e-Maintenance Management System. All maintenance activities of the IAF have been declared paperless by the Raksha Mantri in February during Aero India 2023. The IAF is also progressing cases for implementing e-MMS for nine fleets from the Indian Army, Navy & Coast Guard.

**Digitisation of THD-1955 Radar:** THD-1955 radar has been the main stay AD Radar in IAF since 1976. To meet the operational commitment, the THD-1955 radar fleet is planned to be utilised in service till 2035. Presently, due to ageing of the fleet, obsolescence and depleting vendor supports, THD-1955 radar fleet is facing significant challenges towards its maintenance and sustenance for operations. To address these issue, BEL has come up with a proposal to digitise the Receiver and Transmitter cabinets along with upgrade of IFF systems of radar.

**Bio-jet Fuel Trials on Do-228 Aircraft:** Post successful completion of ground run and test flight, RCMA (Kanpur) accorded FCN for Biojet fuel trials on 21 Sep 23. The first sortie for two hrs with 10% blended fuel on one engine was successfully flown on 22 Sep 23. Two sorties with 10% blended fuel on both engines was flown for four hrs on 26 Sep 23. Third sortie was flown on 27 Sep 23. The trials on Do-228 aircraft using 10:90 admixtures of Bio-jet fuel with ATF were successfully completed at 5 BRD on 28 Sep 23. Additional 6,000 Ltrs of Bio-jet fuel is under procurement which would be used in next phase of trials.

**Development of Airfield at Nyoma, Ladakh:** To enhance the operational reach of IAF in the Northern Sector, Government sanction to develop a new Air Base at a cost of ₹219.39 Crore was accorded in March 2023. e-Shilanyas of the airfield was performed by RM on 12 Sep 23 from Jammu. Construction of runway is in progress and the works services are planned to be completed by April 2025.

**Real Time Aircraft Tracking System (RTATS).** The feasibility of RTATS with the help of equipment provided by ISRO, using Navigation with Indian Constellation (NavIC) satellites is reaching fructification. Series modification on AN-32 will start soon. While trials on MLH are underway later to be followed by AVRO & Do-228 in due course.

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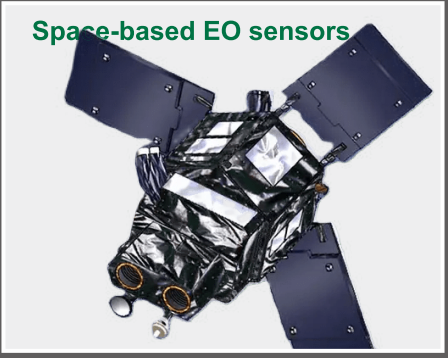




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## Defence & Aerospace: 2023 in Review

# IAF Indigenisation and Atmanirbharta Efforts

**IMR Special Report**

**indigenisation**

The following measures have been instituted to support indigenisation of spares and systems:

**Positive Indigenisation List:** In pursuance of India's endeavor for self-reliance, Ministry of Defence is promulgating 'Positive Indigenisation Lists' at periodic intervals. The fifth PIL was released in October with 98 items, out of which 13 pertain to IAF.

**Srijan Defence Web Portal:** A list of 630 spares has been uploaded on www.srijandefence.gov.in website towards seeking feasibility for indigenous development. 78 companies have shown interest so far.

**Inter Governmental Agreement:** An IGA was signed in September between India & Russia for enabling manufacture of Russian Origin Spares in India. A series of JVs have been signed by Indian companies towards fructification of the same.

**Industry Outreach:** To bring together the users from the IAF and the Indian Defence industry representatives to discuss, identify and understand problem areas, Industry Outreach was planned by undertaking visits to IAF bases. Two Industry Outreach events were conducted at Air Force Station Bareilly and Air Force Station Pune in September and October respectively. The station authorities organized the visit, providing guided tours to various sections within the Station. Industry representatives were given the chance to engage in discussions and Q&A sessions with Air Force experts in their respective fields, facilitating knowledge exchange and networking.

**Space Industry Outreach:** Of the total 29 DefSpace challenges pertaining to IAF (12 iDEX and 17 Make challenges), High Power Steering Committee (HPSC) meeting for 12 iDEX has been concluded. iDEX winners for eight DefSpace Challenges and one open challenge were announced in October. Selection of winners for the four iDEX DefSpace challenges is under progress at DIO. Feasibility study for the Make I and II DefSpace challenges are under progress. PDC for completion of Feasibility Study for all Make challenges is 31 Dec 23.

**IAF has carried out Industry Outreach Programmes for industry partners at a number of stations to encourage them to develop solutions for the IAF.**

> **"In pursuance of India's endeavor for self-reliance, Ministry of Defence is promulgating 'Positive Indigenisation Lists' at periodic intervals. The fifth PIL was released in October with 98 items, out of which 13 pertain to IAF."**

**Signing of MoUs:** IAF entered into 21 MoUs with Academia, Educational Institutes and DRDO labs for cooperation and promotion of R&D in areas of mutual interest.

**Indigenisation of CU of LLLWR:** To achieve self-reliance in the maintenance and upkeep of the IAF's Low Level Light Weight Radars, a contract for design and development of three critical components was signed with BEL. The high altitude field trial of one such component was completed successfully. The case for procurement of these is now under progress.

**Indigenisation of Parachutes:** Almost 90-95% of pilot parachutes and brake parachutes in use by IAF have been indigenised by ADRDE within a timeframe of two years.

**Indigenous 'Miniature Detonating Cord':** The firing trials of the indigenous Miniature Detonating Cord (MDC) for the Hawk Aircraft Canopy Severance System were successfully completed in November. Airworthiness clearance for use on fleet is under progress.

The effort will mitigate delays in supplies of imported MDC.

**Modification of Electric Operating Fire Extinguisher Cartridges:** The modification was successfully completed through OF, Khamaria and AQAW(A), Khamaria to address quality issues of earlier design. The modified carts were inducted in service in July.

**Development of Unexploded Ordnance Handling Robot:** Project on development of UXOR for disposal of UXOs with the technique of water cutting jet was pursued with R&DE (Engg), Pune. Three prototypes had been developed based on approved ASQRs. Procurement of UXOR was taken up through FTP route. Contract has been signed with Hi-Tech Robotics Systemz Ltd, Gurugram for UXORs in September.

**MRSAM:** Five Firing Units and one training centre of MRSAM system have been commissioned in IAF in this year. System has been successfully deployed.

**Project SAMAR:** IAF has successfully indigenised the prototype of ground based platform for firing Air-to-Air missile under project SAMAR. Fabrication of SAMAR Firing Units (FUs) have been successfully completed this year. SAMAR FUs were delivered to field units and firing is planned in Dec 23.

**Self-Reliance Plans:** The Russia-Ukraine conflict has resulted in inability to send major aggregates like the aero-engines, critical avionics and specialist wpns abroad for Repairs and Overhaul. To mitigate the situation, 44 shortlisted projects pertaining to Russian Fighter, Transport and Helicopters are being progressed through OCPP under the following categories:

- Life Extension.
- Development and execution of ROH technologies for Airframes, Electro-Mechanical rotables, avionics, EW systems of AN 32, Mi Series helicopters.
- Repair and refurbishment of Russian ALMs and Russian aero engines and avionics.
- Replacement of avionic aggregates.

A comprehensive self-reliance plan to engage the Defence Industrial Corridors at Uttar Pradesh and Tamil Nadu has been chalked out. Regular interaction has been established with UPEIDA and feasibility to identify the domain specialists, academia and MSMEs/Industry partners is being explored. A meeting with Tier-I industries of TIDCO was conducted in September at Chennai to highlight the indigenisation projects under OCPP with the IAF team led by AOM. The industries were appraised in detail on the indigenisation requirements of IAF. The team visited Research Park at IIT Chennai on 13 Sep 23 and interacted with the potential Industry partners who could take on the task.

**IAF tested the SAMAR (surface-to-air missile for assured retaliation) air defence system in mid-Dec 2023.**

**"First C-295 MW aircraft arrived in India on 20 Sep 23 and was inducted into the IAF on 25 Sep 23. The ageing Avro aircraft would be replaced by C-295 MW aircraft. With the delivery of remaining ac from May 24 onwards, the first unit is likely to be functional by end-2024."**

**New Acquisitions and Trials**

**A-321 aircraft:** Pre-owned Airbus A-321 were acquired by DRDO from Air India for AEW&C role. They are available for utilisation by IAF before they are modified. Aircraft and aircrew were made operational at the earliest and IAF has commenced the Courier operations since May 2023. The A-321 scheduled flights to Srinagar, Guwahati and Bagdogra have augmented IA movement plan and the courier ops from Kolkata, Chennai and Port Blair has benefitted the ANC AoR. MoU for handling by Air India at all IAF and Non IAF bases has been signed.

**C-295 aircraft:** First C-295 MW aircraft arrived in India on 20 Sep 23 and was inducted into the IAF on 25 Sep 23. The ageing Avro aircraft would be replaced by C-295 MW aircraft. With the delivery of remaining ac from May 24 onwards, the first unit is likely to be functional by end of year 2024. The induction of C-295 fleet will boost IAF's airlift capability and increase the versatility of ground forces.

**LCA Mk1 Twin Seater Delivery:** Delivery of Twin Seaters, LCA Mk1 IOC and FOC contracts have commenced. PM flew in SPT-1 with Gp Capt D Mandal on 25 Nov 23. He was the first PM to fly a fighter aircraft.

**HTT-40 Basic Trainer Aircraft:** HTT-40 is a basic trainer aircraft used for training of ab-initio pilots. The aircraft is indigenously designed and developed by Hindustan Aeronautics Limited (HAL). The contract for supply of HTT-40 was signed on 06 Mar 2023. As per contract, deliveries of the aircraft will start from Sep 2025.

**Dornier-228 Aircraft:** Dornier-228 is light weight transport Aircraft utilized by IAF for communication, route transport and casualty evacuation. It is manufactured locally by Hindustan Aeronautics Limited (HAL). A contract for supply of Dornier-228 Aircraft and associated equipment was signed on 10 Mar 2023.

**Digital Receiver-118 (DR-118) RWR for Su-30 MKI aircraft:** A contract for Digital Receiver-118 (DR-118) RWR for Su-30 ac along with associated equipment has been signed with M/s BEL, BC on 23 Mar 23.

## Defence & Aerospace: 2023 in Review

# Indian Navy's Operations and Exercises

**IMR Special Report**

**Operational Deployments**

Indian Navy undertook mission-based deployments in Areas of Interest in the Indian Ocean Region (IOR) to safeguard national maritime interests and maintain continuous/ near continuous presence in areas of significant maritime importance in the IOR. These deployments were in consonance with the Prime Minister's vision of 'Security And Growth for All in the Region (SAGAR)'. IN ships and aircraft were regularly deployed in the Gulf of Oman/ Persian Gulf, Gulf of Aden/ Red Sea, South and Central IOR, off Sunda Strait, Andaman Sea/ approaches to Malacca Strait and Northern Bay of Bengal. These deployments facilitated enhanced Maritime Domain Awareness, swift Humanitarian Assistance and Disaster Relief (HADR) assistance to IOR littorals, security to Indian and international maritime community and operational engagements with friendly navies through capability development and capacity building programmes.

Anti-Piracy Patrol in Gulf of Aden commenced in 2008 to ensure safe passage of IFMVs. 107 IN ships have been deployed in the Gulf of Aden since commencement of patrols in 2008.

Maritime Security Operation code-named Op Sankalp in the Gulf Region commenced in 2019 to ensure safe passage of IFMVs transiting through the Strait of Hormuz. Since June 2019, IN has deployed 41 warships and escorted approximately 624 Lakh Tons of cargo onboard 503 IFMVs.

Indian Navy ships and aircraft were regularly deployed for anti-piracy ops near hot spots in the Persian Gulf, Red Sea, IOR and near Malacca Strait

**" Indian Navy deployments facilitated enhanced Maritime Domain Awareness, swift Humanitarian Assistance and Disaster Relief assistance to IOR littorals, security to Indian and international maritime community,, and op engagements.**

In 2023, Indian Navy, has intercepted huge heroin shipments in the Arabian Sea. On May 10, 2023 an Anti-Narcotics Operation (ANO) lead to seizure of 2500 kg of contraband worth Rs. 12,000 Cr. Since April 2021, 12 such operations have been undertaken by the IN. Narcotics worth Rs. 29000 Cr (approx. 3.5 Bn Dollars) has been seized over six operations in last three years.

P8I aircraft from INS Hansa, Goa

was deployed in Northern Sector for surveillance on various occasions in support of Army/ Air Force tasking. Such deployments ensure seamless operability between all three forces and encourages jointmanship.

A Naval Special Warfare exercise off Carnic, was conducted on September 21, 2023 which included twin Air Droppable Rigid Hull Inflatable Boats (ADR) drop in tandem with Combat Free Fall (CFF).

The IN undertook its maiden operations with both the carriers in company off Goa in Early June 2023. The Western Naval Command enabled the embarkation of the largest number of carrier-borne aircraft, which included 20 helicopters of various types. These included the indigenously manufactured ALH MK III helicopters and the recently inducted, MH 60R. The event was a potent demonstration of IN's fast-growing blue water capability and gained considerable attention from national and international media.

IN Submarine Vagir, was deployed for Long Range Deployment to Fremantle, Australia wef July 24, 2023. The submarine crew interacted with the Australian Naval representatives during OTRs at Fremantle (August 20 – 23, 2023 and August 25 – 28, 2023). The submarine returned to Visakhapatnam in early October 2023.

The Test Vehicle Abort mission (TV-D1) was launched on October 21, 2023 from Satish Dhavan Space Centre (SDSC), Shriharikota. The aim of TV-D1 launch was to validate the efficiency of Crew Escape System (CES) during an emergency abort condition while the crew module is within atmospheric limits. Post launch and successful ejection, recovery of Crew Module and recording of the launch (as required by ISRO) was successfully undertaken by IN. INS Shakti recovered the crew module which was later disembarked at Chennai. The video of crew module decent phase was also live streamed to SDSC. Assets deployed for the mission included three IN ships (Shakti, Gharial and Battimalv), SCI Saraswati, one HALE UAV and a Chetak Helicopter.

**Indian Navy participated in Ex Sea Dragon 23 in waters off Guam, USA from 15-30 March 23.**

**Naval Exercises**

IN's Theatre Readiness Operational Level Exercise (TROPEX), a major biennial exercise, was conducted across the Indian Ocean Region from January to February, 2023. Intense operations by more than 150 warships, submarines and aircraft, with significant participation of other Services, were conducted. The exercise culminated with a debrief at Kochi.

Tri-Services Amphibious Exercise (AMPHEX 23) was conducted at Naval Enclave Kakinada, with Visakhapatnam as the mounting base. This edition of the exercise was the largest in terms of force levels from Indian Army, with over 800 troops (being the maximum participation till date). Further, loading of large number of A and B type vehicles was also undertaken, which was the highest thus far in any AMPHEX.

IN Sailing Vessel Tarini was deployed for Open Sea Sailing Expedition wef 22 Nov 22 with a crew of five (including 02 Women Officers). Tarini successfully completed a 17,000 Nm trans-ocean inter-continental voyage to South Africa and South America (Cape to Rio Race). A grand Flag-in ceremony for the crew of INSV Tarini was conducted at INS Mandovi on May 23, 2023, with Shri Pramod Sawant, Chief Minister of Goa, as the Chief Guest. Smt Smriti Irani, the Union Minister of Women and Child Welfare, accompanied by CNS, also graced the occasion.

**Exercises with Friendly Countries**

IN ships Kolkata, Sahyadri and P8I participated in the 31st edition of Exercise MALABAR 23 scheduled at/off Sydney, Australia from August 11 to 23, 2023, along with ships and aircraft from US Navy, JMSDF and RAN. MALABAR 23 was conducted in two phases viz the Harbour Phase (August 11-15, 2023) encompassing cross deck visit, pre-sail conferences and delegation visits, followed by the

Sea Phase (August 16-21, 2023) comprising various surface, sub-surface and air exercises involving units from all participating countries. The ships also participated in the 77th Independence Day Celebrations at Sydney, Australia.

IN ships Chennai and Teg, along with aircraft (MiG 29K, P8I, Dornier, ALH and Sea King), participated in the 21st edition of Exercise Varuna - 23 with French Navy Carrier Strike Group (comprising Charles De Gaulle, Forbin, Provence and Marne), alongwith maritime patrol aircraft Atlantique 2 off Goa from January 15 to 20, 2023. Subsequently, the FN ships Charles De Gaulle, Forbin and Provence entered Goa, while Marne entered Mumbai for the Harbour Phase of the Exercise. French aircraft Atlantique, A330 MRTT and A400M operated from INS Hansa, Goa.

IN ships Sahyadri and Jyoti participated in the 3rd edition of the Multilateral Exercise La Perouse conducted in Southern Bay of Bengal from March 13 to 14, 2023. Eight warships from six countries (Australia, India, France, Japan, UK and USA) participated in the exercise.

Sea Dragon is a multilateral Air ASW exercise conducted by US Navy. IN P8I aircraft participated in the 5th edition of Anti-Submarine Warfare (ASW) Theatre Exercise Sea Dragon 23 conducted at Guam, USA from March 15 to 29, 2023. Maritime Patrol Aircraft (MPA) from four countries (USA, Japan, Canada and South Korea) and USS Hampton (Los Angeles Class SSN) participated in the exercise.

IN Ship Trishul and Dornier aircraft participated in the annual bilateral maritime exercise Konkan 23 with Royal Navy ship HMS Lancaster off Mumbai from March 20 to 22, 2023. Both ships undertook multiple maritime drills to enhance interoperability and imbibe best practices. The exercises covered all

**5th edition of AUSINDEX maritime exercise between Indian Navy and Royal Australian Navy (RAN) was held on 22-25 August 23 at Sydney, Australia**

domains of maritime operations viz air, surface and sub-surface.

IN ships Delhi and Satpura, alongwith P8I aircraft, participated in the maiden ASEAN India Maritime Exercise (AIME) and International Maritime Defence Exhibition (IMDEX) conducted at Singapore from May 02 to 08, 2023.

INS Sumedha participated in Multilateral Tri-Services Exercise Bright Star 23 conducted in the Mediterranean Sea from 6 to 13 Sep 23. The Exercise was conducted in two phases, Harbour phase and Sea phase.

IN and USN have been participating in a combined Salvage exercise since 2005. Seventh edition of IN - USN Diving, Salvage and EOD exercise (SALVEX) was conducted from June 26 June to 6 July 2023 at Kochi. For the duration of the exercise, USNS Salvor (T-ARS 52) made port call at Kochi.

IN Ships Savitri and Kiltan participated in India - Sri Lanka bilateral exercise SLINEX 23 with Sri Lankan Navy ships SLNS Vijaybahu and Samudura at/ off Colombo, Sri Lanka from 3 to 8 April 2023. IN-SLN SF exercise was also conducted as part of SLINEX 23 from 3 to 6 April 2023 at Colombo, Sri Lanka.

INS Kavaratti, along with one Dornier aircraft participated in the 4th edition of Exercise Samudra Shakti 23 conducted at Batam, Indonesia from 15 to 19 May 2023.

IN ships Tarkash and Subhadra, alongwith one Dornier aircraft, participated in bilateral exercise Al-Mohed Al-Hindi conducted at Al Jubail, Saudi Arabia, from 21 to 25 May 2023. Royal Saudi Naval Forces (RSNF) ships Badr, Abdul Aziz and two HIS-32 FACs, one Maritime Patrol Aircraft (MPA), MH60R helicopter and Karayel UAV participated in the exercise.

INS Tarkash participated in the maiden India-France-UAE trilateral exercise with FS Surcouf and Maritime Patrol Aircraft ex-UAE in Gulf of Oman from 6 to 8 June 2023.

Maiden India-France-UAE trilateral PASSEX was conducted from 7 to 8 June 2023, off Gulf of Oman. INS Tarkash, FS Surcouf and UAE Navy helicopter (Panther) participated in the exercise.

INS Satpura participated in the

fourth edition of Multilateral Naval Exercise KOMODO-23 conducted at Makassar, Indonesia, from 4 to 8 June 2023. The exercise saw the participation of navies from 36 countries and was conducted between Borneo and Sulawesi.

The 5th edition of AUSINDEX was conducted from 22 to 25 August 2023 at/ off Sydney, Australia. IN Ships Sahyadri and Kolkata participated in the exercise, along with HMAS Choules and HMAS Brisbane from RAN. In addition to the ships and their integral helos, the exercise also witnessed participation of fighters and Maritime Patrol Aircraft (MPA) from Royal Australian Air Force (RAAF).

IN ships Ranvijay and Kavaratti, alongwith submarine Sindhukesari and P8I aircraft, participated in the 30th edition of SIMBEX-23, with Singapore Navy ships Stalwart, Valour, submarine Invincible and Fokker aircraft at/ off Singapore from 20 to 27 September 2023.

**Assistance to Foreign Govts**

INS Tarmugli was handed over to Maldives on 2 May 2023 towards capability building. The ship was re-commissioned into Maldivian Navy as MCGS Huravee. The handing over ceremony was attended by the RM. Further one Landing Craft Assault (LCA) was also handed over to Maldives.

INS Kirpan was decommissioned and handed over to Vietnam People's Navy (VPN) on 22 July 2023 at Cam Ranh, Vietnam in the presence of CNS and RAdm Pham Manh Hung, Deputy C-in-C & Chief of Staff, VPN. CNS also visited VPN Headquarters at Hai Phong for bilateral interaction with Vice Adm Tran Thanh Nghiem, C-in-C, VPN. The transfer of ex-Kirpan symbolises the status of IN as the 'Preferred Security Partner' in the IOR and would be a catalyst for enhancing the existing bilateral relations between the two navies.

Towards providing assistance to friendly foreign nations, IN is undertaking refits of MCGS Victory from Mauritius. Further, INS Sharda undertook towing operation to tow MCGS Victory from Port Louis, Mauritius to Visakhapatnam.

A Tri-Services Scoping Delegation was deputed to Suriname in July 2023 to identify and evaluate the requirement of Surinamese Armed Forces. On the Naval front, technical assistance to undertake repairs of six Patrol Craft was highlighted by the Suriname side and accordingly, suitable technical team is planned to be deputed.

A five member IN Technical Team was deputed to Sri Lanka in February 2023 to assess the existing Trials Team infrastructure of Sri Lankan Navy (SLN) and indicate measures in setting-up of Trials Unit of SLN akin to IN units. As a follow-up of the visit, IN is conducting customised courses for SLN in India, as per the request of SLN. Further, spares worth Rs 1.7 cr were gifted to SLN, towards ensuring optimal availability of GoI gifted ships.

Indian Navy has progressed WSIE agreements with 25 countries and one multinational construct, till date. While such agreements with several other friendly foreign countries are being progressed, a WSIE agreement was concluded with Tanzania on 9 October 2023.

aIN ships Tir, Sujata and CGS Sarathi as part of 1st Training Squadron, whilst on overseas deployment, were utilised to provide assistance to Mauritius and Seychelles besides enhancing foreign cooperation

**HADR & SAR operations**

'Operation Kaveri' was executed towards evacuating Indian nationals from Sudan owing to military clashes between Sudanese Armed Forces (SAF) and Rapid Support Force (RSF). In order to contribute to the national effort for evacuating Indian nationals from Sudan, three mission deployed IN ships viz Teg, Tarkash and Sumedha, with HADR items and medical teams, were diverted to Red Sea. In a challenging mission, in the absence of any support infrastructure ashore, Sumedha, the first ship to arrive, entered the war zone and undertook Non-Combatant Evacuation Operations. Thereafter, various multi national forces including China, France, USA and UK also undertook alongside evacuation. A total of 1490 Indian nationals were evacuated by three IN ships.

In the aftermath of devastation caused by Severe Cyclonic Storm Mocha off Sittwe, Myanmar, on 14 May 2023, India launched Operation Karuna, as part of Mission SAGAR, to provide Humanitarian Assistance and Disaster Relief (HADR) material to Myanmar. Four IN ships namely Shivalik, Kamorta, Savitri and Gharial, were deployed to Yangon, Myanmar for transhipment of HADR items from 18 to 20 May 2023.

P8I aircraft was launched on a benign mission on 17 and 18 May 2023 for search of Chinese fishing vessel Lu Peng Yuan Yu 028. P8I sighted the capsized CFV Lu Peng Yuan Yu 028 and a life raft. The positions were relayed to PLA(N) 44th APEF operating in the area. This was the first occasion in which an IN aircraft provided SAR assistance to a Chinese vessel.

During the year, the Indian Navy provided assistance to civil authorities for fire fighting, SAR and humanitarian assistance.

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# US, India defense officials meet to talk regional security

BY ASHOK SHARMA, AP

**NEW DELHI** — India and the U.S. underlined their commitment to boosting security ties November 17 as their top diplomats and defense chiefs met to discuss regional security, China, and the wars in Ukraine and Gaza.

U.S. Secretary of State Antony Blinken and U.S. Defense Secretary Lloyd Austin met with their Indian counterparts in New Delhi as part of an Asian trip aimed at showing unity over Russia's war in Ukraine and preventing differences on the Israel-Hamas war from deepening.

Blinken said the U.S. and India were continuing to "deepen our collaboration on everything from emerging technologies to defense to people-to-people ties" and align diplomacy for "an Indo-Pacific region that's free, that's open, that's prosperous, that's resilient."

He said the two sides discussed the crisis in the Middle East and "we appreciate the fact that from day one India has strongly condemned the attacks of Oct. 7. And as our joint statement makes clear, India and the United States stand with Israel against terrorists."

Indian External Affairs Minister Subrahmanyam Jaishankar said the situation in the Middle East was a big concern. While India has condemned the Hamas attack on Israel, it balances its position by calling for talks on "a sovereign, independent and viable state of Palestine living within secure and recognized borders, side-by-side at peace with Israel."

Blinken met with India's Prime Minister Narendra Modi and "reaffirmed their shared vision for close partnership in the Indo-Pacific," said U.S. State Department spokesperson Matthew Miller.

"They emphasized working together to address ongoing crises such as Russia's war against Ukraine and the conflict in the Middle East," Miller said.

Vinay Mohan Kwatra, India's top bureaucrat in the foreign ministry, said India's tense ties with China also were discussed at the official-level talks, but declined to give details.

India's relationship with China has deteriorated since 2020, when Indian and Chinese troops clashed along their disputed border in the Himalayan Ladakh region, leaving 20 Indian and four Chinese soldiers dead. A standoff involving thousands of soldiers in the eastern Ladakh region continues, despite several rounds of military and diplomatic talks.

Jonathan Ernst/AP

U.S. Defense Secretary Lloyd Austin, right, with Secretary of State Antony Blinken, second right, speaks with their Indian counterparts in New Delhi, India, on Nov. 10, 2023.

**" While India has condemned the Hamas attack on Israel, it balances its position by calling for talks on "a sovereign, independent and viable state of Palestine.""**

Blinken said he also discussed with the Indian side a diplomatic dispute that erupted when Canada alleged that India was involved in the assassination of a Sikh separatist in Canada.

Blinken said that the U.S. wants the two sides to resolve their differences in a cooperative way and urged India to "work with Canada on its investigation."

The dispute started when Canadian Prime Minister Justin Trudeau said there were "credible allegations" of Indian involvement in the killing of Canadian citizen Hardeep Singh Nijjar in suburban Vancouver in western Canada. India rejected the accusation.

India and the U.S. have held so-called two-plus-two talks between India's external affairs and defense ministers and the U.S. secretaries of state and defense since 2018 to discuss issues of concern and strengthen bilateral ties.

Austin and his Indian counterpart, Rajnath Singh, discussed a roadmap for defense industrial cooperation that will fast-track technology cooperation and co-production of defense systems, India's defense ministry said.

"We're integrating our industrial bases, strengthening our interoperability, and sharing cutting-edge technology," Austin said in his opening remarks.

Washington expects India to be a leading security provider in the Indo-Pacific region.

During Indian Prime Minister Narendra Modi's visit to the United States in June, the two sides adopted a policy guide for defense industries to enable them to produce advanced defense systems together and collaborate on research and testing of prototypes.

The two sides reached an agreement that will allow U.S.-based General Electric to partner with India-based Hindustan Aeronautics to produce jet engines for Indian aircraft in India and the sale of U.S.-made armed MQ-9B SeaGuardian drones.

A joint statement at the conclusion of Blinken and Austin's visit to New Delhi on Friday said the two sides reaffirmed their roadmap for defense industrial cooperation to strengthen India's capabilities, enhance its defense production, facilitate technology-sharing, and promote supply chain resilience.a

# India, Australia to hold talks to boost defense ties

**NEW DELHI —** India and Australia are set to hold talks focused on bolstering their strategic, defense and security ties on 20 November in New Delhi.

Australian Foreign Affairs Minister Penny Wong and Defence Minister Richard Marles arrived to meet with their counterparts for the second India-Australia 2+2 Dialogue, where they're expected to discuss regional and global issues, according to a statement from India's Ministry of External Affairs.

"Both sides will also exchange views on shared priorities for strengthening minilateral and multilateral cooperation," the statement said.

Indian Defence Minister Rajnath Singh will hold a bilateral meeting with Marles, who is also the deputy prime minister. India's minister of external affairs, Subhramanyam Jaishankar, will take stock of ties between the two countries with his counterpart Wong on 22 Niovember, according to the statement.

The talks come a few weeks after India hosted U.S. Secretary of State Antony Blinken and U.S. Secretary of Defense Lloyd Austin in New Delhi, where both countries underlined their commitment to boosting security ties and reaffirmed their support for a free and resilient Indo-Pacific region.

India and Australia are also part of the Quad, an alliance that includes Japan and the United States, which aims to counter China's rising influence in Asia.

Indian External Affairs Ministry via AP

Australian Foreign Affairs Minister Penny Wong, left, meets with an unidentified Indian official upon arrival at the airport in New Delhi, India, on Nov. 23, 2023.

The two countries upgraded their relationship to a Comprehensive Strategic Partnership in 2020, when they signed various agreements to strengthen defense ties and cooperation in the Indo-Pacific.

Earlier this year, Australian Prime Minister Anthony Albanese arrived in India on a four-day visit where he held talks with his Indian counterpart Narendra Modi and praised the two countries' progress in ties, including in scientific and technological cooperation and military exercises.

DefenseNews

# What China's increasing use of military over diplomacy means for US

BY NOAH ROBERTSON

**WASHINGTON** — In August 2022, after former House Speaker Nancy Pelosi visited Taiwan, China's military did the talking.

It lobbed ballistic missiles around the island, some landing just inside Japanese waters. More than 20 Chinese aircraft flew across the midpoint between the mainland and Taiwan, a move once considered taboo. The People's Liberation Army staged elaborate military exercises, rehearsing the parts it could play in an actual invasion.

There were two key aspects of the response: One, the PLA flouted norms — and has kept doing so in the year since — that had kept the Taiwan Strait stable for decades. And two, while China's government had multiple ways to signal its displeasure at the visit, it chose its military.

This is a new hallmark of Chinese foreign policy under President Xi Jinping, according to the Pentagon's annual assessment of China's military strength.

"The [People's Republic of China] has increasingly turned to the PLA as an instrument of statecraft to advance its foreign policy objectives," the report noted.

In other words, when China senses a problem abroad, it's now more likely to use the military to solve it. This approach, say Pentagon officials and outside analysts, has been in the works for years and speaks to the PLA's weight class.

China has spent decades bolstering its military with the goal to fully become a "world class" force by 2049. That offers challenges for the U.S., which has spent recent years shoring up alliances and partnerships in the vast Indo-Pacific region.

While the U.S. may soon encounter Chinese forces in more areas around the globe, it's also concerned about China's desire to unite Taiwan with the mainland, since Beijing considers the island nation a rogue province. And a foreign policy reliant on military force could make an invasion more likely.

"If you go back to 2016, the military element was part of what has been a diplomatic, economic, information, influence, and military pressure campaign against Taiwan," a senior Pentagon official said on the condition of anonymity in order to speak candidly. "What we've seen in more recent years is the military playing a more outsized role in that pressure campaign."

Mei Shaoquan/Xinhua via AP

A Chinese fighter pilot takes part in military drills around Taiwan on April 9, 2023.

**'A more precise hammer'**

Nearly every world power, if not all, uses its military for statecraft — not least the United States. Take for example the two flotillas America rushed to the Middle East after Israel declared war against Hamas in the Gaza Strip in October.

China may have longed for such a capability, but lacked the military strength.

Then came Xi Jinping.

Since he took office in 2012, the Chinese president has steered massive amounts of money into the military. It now spends the second-most money on defense with a budget of about $230 billion in 2022, according to the Pentagon report; only America's defense spending exceeds that amount, with the Defense Department's fiscal 2022 budget reaching $740 billion.

In October 2022, Xi reaffirmed his goal for the PLA to be capable of unifying Taiwan with the mainland by 2027. By 2035, its modernization effort is to be "basically complete," the Pentagon noted.

Among the trends noted in the Pentagon's report are a rise in China's ballistic missile arsenal, the addition of 30 ships in the People's Liberation Army Navy fleet, and a growth in the People's Liberation Army Air Force's combat aircraft fleet.

And last year, the Chinese military continued its trend of holding increasingly more military exercises with Russia, one of America's leading adversaries. The Pentagon anticipates the PLA will host more joint drills with foreign partners in the years ahead.

China's military is also "very likely" working to grow the number of overseas logistics facilities after the first such base in Djibouti in 2017, the report noted.

"We're going to have to be prepared for PLA presence, ultimately, in locations where we're not used to having them," the Pentagon official said.

Closer to home, China's military has shown assertiveness in the South China Sea and around Taiwan. The Pentagon has recently released videos showing Chinese jets buzzing past U.S. and allied aircraft in the region. In one example, a Chinese J-11 fighter flew within 10 feet from an American

B-52 bomber at night. There were more than 180 of these "coercive and risky" intercepts against American aircraft in the last two years — more than occurred in the previous decade, according to the Pentagon.

This is part of a larger effort by Beijing to use the military as a regional bouncer, per U.S. assessments.

"They're leaning on the PLA more to try to intimidate, to coerce, to increase risk, and thereby make the U.S. ... and other countries think twice about conducting actions that we have every right to conduct," the Pentagon official said.

So far, this midair activity has amounted to only close calls. In part, that reflects China's newfound capabilities. For example, in 2001, one of its aircraft crashed into a U.S. surveillance plane, leading to a short-lived diplomatic crisis.

But today, China's pilots are more skilled and its aircraft more advanced, allowing them to fly closer to adversaries while avoiding a collision, according to Rod Lee, director of research at the U.S. Air Force's China Aerospace Studies Institute.

"They can use the military maybe not as a scalpel, but it is a more precise hammer than it used to be," Lee told Defense News.

According to Meia Nouwens, a China expert at the International Institute for Strategic Studies think tank, Beijing may increasingly find diplomacy less appealing when it comes to its relationship with Taipei.

"It just seems like perhaps they're more willing [to use the PLA] because they have the capability to do so, but also because there are fewer options left for them to explore," she said.

# China, Pakistan wrap up naval drill featuring sub, high-tech destroyer

**BY USMAN ANSARI**

**ISLAMABAD —** China and Pakistan on 17 November wrapped up their largest bilateral naval exercise to date, marking the first time Pakistan hosted such an advanced Chinese destroyer for training.

The Sea Guardians event is the latest in series of joint maritime exercises that began in 2014, but this is the third time it took on that title. The drills take place annually, and the two countries alternate as hosts. The sea phase this month off Pakistan's port city of Karachi.

The exercise, which ran Nov. 11-17, aimed to demonstrate China and Pakistan's common aim to safeguard their shared economic corridor — a key part of Beijing's Belt and Road Initiative — according to Senior Capt. Qi Jian of the Chinese People's Liberation Army Navy, who spoke during a media briefing before the drills.

Officials at the briefing also noted the exercise would help strengthen Sino-Pakistan relations and explore new avenues for naval cooperation.


(Wei Chenping/Chinese Defense Ministry

Ships attached to a destroyer flotilla with the Chinese People's Liberation Army Navy sail in formation en route to a training exercise in the East China Sea.

**Drill participants**

The Chinese contingent included the Type 052DL destroyer Zibo, the latest version of the design that reportedly features anti-stealth capabilities, and a Song-class submarine. This is the first time Pakistan hosted such an advanced Chinese destroyer for an exercise.

Other Chinese submarines have visited Pakistan. In 2015, a Type 039A/Type 041 Yuan diesel-electric sub docked in Karachi, followed by a Type 093 Shang nuclear-powered attack boat in 2017.

The rest of the Chinese fleet attending this month's exercise included the two Type 054A frigates Jingzhou and Linyi, the submarine support ship and replenishment vessel Qiandaohua, helicopters, and a marine detachment.

One element of the exercise began Nov. 14 with Chinese vessels and the Pakistani Type 054A/P frigate Shahjahan sailing out of Karachi.

The Chinese frigate Linyi and the Pakistani F-22P frigate Saif appear to have undertaken separate joint maritime drills.

Other elements of the Pakistan Navy participating in the exercise included Azmat-class missile boats and aircraft. The head of the Pakistan Navy's media branch, Commodore Syed Rizwan Khalid, said no Pakistani submarine attended, noting that "for the safety of participating units, normally only one submarine participates in an exercise."

Command of the flotilla rotated to each ship, with onboard observers monitoring the organization and implementation of the drills.

Khalid told Defense News the drills "simulated [a] multi-threat environment." The training — for visit, board, search and seizure missions; air defense; anti-surface warfare; joint anti-submarine warfare; countermine operations; and special operations — helped "further enhance maritime cooperation and defense relations through mutual exchange of maritime experience and interoperability between the two navies."

"Both navies have been regularly participating in this series of exercises, and interoperability between both the navies has significantly matured to undertake full-spectrum maritime operations together in the Arabian Sea," he added.

**The India factor**

Frank O'Donnell, a South Asia expert with the Stimson Center think tank, said this month's Sea Guardians event reemphasized "Chinese commitment to modernizing Pakistan's Navy and expanding its presence in the Indian Ocean."

India's Navy, he told Defense News, was "reportedly tracking all the Chinese ships involved in the exercise, but it will be especially concerned by the Chinese selection of a Type 052 guided-missile destroyer and Type 039 diesel-electric attack submarine to participate."

While India and Pakistan are rivals, they both have friendly relations with China. However, India and China have clashed in recent years over a border dispute.

"These ship classes are often key elements of [anti-access/area denial] strategies, which has long been Pakistan's naval approach towards India. China-Pakistan operations involving these vessels will strengthen Pakistan's capabilities toward expanding its A2/AD envelope against India," O'Donnell said.

While the Song-class boat may not be China's most advanced submarine, O'Donnell said its presence likely concerned India.

"In particular the Type 039 — as a predecessor class to the eight Type 041s, which Pakistan is acquiring from China, and which will likely be tasked with dual nuclear and conventional strike missions — will give Pakistan additional experience of effectively operating with a submarine very similar to the ones it is inducting," he said.

# General Atomics fires back at critics of MQ-9 drone after downing

**BY ELISABETH GOSSELIN-MALO**

**DUBAI, United Arab Emirates —** The fate of the MQ-9 Reaper has once again entered public debate after senior U.S. defense officials confirmed Houthi militants had downed one of the drones over international waters off the coast of Yemen on Nov. 8.

In recent years, experts have questioned the sustainability of flying such expensive aircraft in contested environments, where less costly countermeasures are able to target them.

For example, in 2021, the Air Force sought to curtail procurement of the General Atomics Aeronautical Systems-made drone in the fiscal 2022 budget.

Earlier this month, Brandon Tseng, the president of drone and software firm Shield AI, said the MQ-9 is "too expensive and too slow to regenerate to continue operating within range of surface to air missiles."

"MQ-9 is a great aircraft, I've used it. But for the future fight, it's role needs to be re-defined to quarterbacking intelligent teams of attritable aircraft," he wrote on LinkedIn. "And this doesn't just apply to MQ-9; it includes MQ-4, MQ-1, P-8, SH-60, etc."

And an article from earlier this year on the U.S. Military Academy's Modern War Institute website noted "the MQ-9 Reaper may not be survivable in an environment characterized by large-scale combat operations."

"There is a decision to be made," wrote Liam Collins, who served as a defense adviser to Ukraine from 2016 to 2018. "Should the US military field more survivable UAVs — ones capable of conducting defensive maneuvers — or invest in smaller ones that it does not mind losing?"

Airman 1st Class William Rio Rosado/U.S. Air Force

An MQ-9 Reaper flies a training mission over the Nevada Test and Training Range on July 15, 2019.

DefenseNews

The article was in response to a March 2023 incident that saw a Russian fighter jet force down a U.S. Reaper over the Black Sea, after initially damaging its propeller. The interception ultimately "resulted in a crash and complete loss" of the aircraft, Air Force Gen. James Hecker, commander of U.S. Air Forces Europe and Africa, said in a statement.

In this image from video released by the U.S. Air Force,

And in July, among other recent reports Russia was harassing MQ-9 drones, a Russian jet fired flares at a Reaper involved in a counterterrorism mission over Syria, damaging its propeller.

Asked about the acquisition process for building — and replacing — these systems, an official with General Atomics Aeronautical Systems said that, "with a hot production line, we can build one in three to eight months."

"But combat loss and attrition are built into the [U.S. Air Force] order scheme. Some amount of loss is expected," C. Mark Brinkley, senior director of communications with the firm, told Defense News at the Dubai Airshow.

The war in Ukraine has shown that successful battlefield outcomes are possible by using large quantities of low-tech and cheap weapons, rather than relying on fewer, more expensive drones.

But Brinkley pushed back at this assessment.

"There are companies out there that want you to believe you can replace the capability of a Reaper or [MQ-9B] SeaGuardian with a 100-pound stomp rocket that can carry 25 pounds for 10 hours. The only catch is they would need a billion dollars to invent some magical artificial intelligence to make them relevant," he said. "Even if that AI existed today and you could swarm 50 of them together, your payload and endurance would be 25% of the MQ-9B. So don't tell me that's the future."

To increase the Reaper's survivability, Brinkley recommended the integration of air-to-air missiles and an early warning radar to "radically change the situation" and reduce harassment opportunities.

This echoed a similar recommendation made by retired Air Force Maj. Gen. Lawrence Stutzriem, who advised the Pentagon to fund the integration of a self-protection capability on the Reaper — something the department has yet to do.

Dave Alexander, the president of General Atomics Aeronautical Systems, offered two ways to respond to the Reaper's vulnerabilities in contested areas.

"You either complain about it," he told Defense News at the show, "or do something about it."

# We need hard laws on military use of AI — and soon

**BY BRANKA MARIJAN**

US Navy

Artificial intelligence's destructive potential has resulted in a flurry of recent governance activity. Mere days before the U.K. hosted its AI Safety Summit from Nov. 1-2, the Biden administration announced the executive order on "Safe, Secure, and Trustworthy Artificial Intelligence." Though the summit in the U.K. set out to focus on catastrophic risks of AI, the U.S. efforts have focused on more concrete issues such as its military uses.

While at the summit, U.S. Vice President Kamala Harris announced several new initiatives that comprised the executive order, such as the new AI Safety Institute. But crucially, Harris also announced that 31 nations had joined the Political Declaration on Responsible Military Use of Artificial Intelligence and Autonomy. The declaration was first announced at the Summit on Responsible Artificial Intelligence in the Military Domain held in February in the Netherlands.

The update on the declaration signals U.S. commitment to this effort and brings attention to the signatory list that includes U.S. allies such as Canada, Australia and France. Notably missing, though, are Russia and China. The likelihood of either state joining a U.S.-led effort in the current geopolitical climate is exceedingly low.

Russia was not welcome at either summit and is unlikely — with its ongoing

invasion of Ukraine — to be brought into these discussions. Even if it was invited, Russia would not likely sign even voluntary documents, as it does not wish to see any regulation, binding or nonbinding, on emerging technologies.

China did attend the summits and sign onto two non-legally binding instruments: the "REAIM 2023 Call to Action"; and the "Bletchley Declaration" agreed to at the U.K. summit. While important for further dialogue, this obscures a greater obstacle that China poses on AI regulation generally — and specifically on military applications of AI.

While China is unlikely to be as obstructionist as Russia has been in multilateral discussions on autonomous weapons, it is clear it will only agree to nonbinding instruments and those that are on its terms. This means that it is unlikely to join the U.S. Political Declaration on Responsible Military Use of AI and Autonomy due to its strategic interests in relation to the technology and the broader geopolitical competition with the U.S.

This was evident when it came to the recent vote on the first-ever resolution on autonomous weapons at the First Committee of the General Assembly, which generally notes that states recognize the urgency to address growing autonomy in weapon systems and to hold more talks. While 164 voted to approve the resolution, China abstained.

China's abstention highlights that it will try to shape any outcome, including delaying efforts, until the terms are favorable to its ambitions to achieve military AI supremacy.

Only two states voted against the resolution: Russia and India.

Neither vote is surprising given both Russia and India have pushed back against more significant regulatory steps at the U.N. Convention on Certain Conventional Weapons, or CCW. Indeed, that forum has largely stalled due to the treatment of consensus as unanimity as well as resistance by Russia and India.

Is the pushback by China, Russia and India insurmountable?

Over the years of discussions on autonomous weapons at the CCW, it has become evident that allies talking to allies does not address the challenge of more adversarial states or states that would be adversaries, primarily for the U.S. and its allies.

China joining some of these discussions should be welcomed. However, there should be no illusion that the presence of China or its signing of nonbinding measures is indicative of its willingness to commit to hard laws.

Now, this may not appear to be an issue, as neither the U.S. nor its allies are too interested in hard laws on military AI. Even the expected "landmark agreement" — reached on the margins of the Asia-Pacific Economic Cooperation summit between the U.S. and China, apparently banning the use of AI in weapons, drones and nuclear command and control — is more than anything going to feature voluntary and aspirational measures.

However, voluntary agreements and exchange of information are much easier to do with allies. When crisis scenarios among more adversarial states arise — and they are likely to as more states deploy AI and more autonomous systems in battlespaces — it will be important to have clarity on what is permissible, communication channels open, and clear rules guiding uses of AI and autonomy. It is likely sooner rather than later that states will realize the benefit of some legally binding instruments as well.

The political declaration and the first-ever U.N. resolution on autonomous weapons are important steps forward, as is the expected bilateral agreement between the U.S. and China. But more governance, including hard laws and complementary processes on military AI and autonomous weapons, is needed. This will require a degree of skilled diplomacy to engage not just allies but potential adversaries, and to craft legal agreements. Only then will the risks that come with military AI, such as errors and conflict escalation, be truly addressed.

# Russia is gearing up for a long war. Will the West follow suit?

**BY MAX BERGMANN AND TINA DOLBAIA**

Russian President Vladimir Putin may have expected a quick victory when launching his invasion of Ukraine, now almost two years ago. But with as many as 300,000 Russian troops killed or wounded and thousands of Russian weapons expended on the battlefield, Russia is now gearing up for a long war.

The Russian government proposed a new budget that shows the Kremlin is mobilizing its economy for a long war of attrition. Defense spending in the new budget will account for 29.4%, or nearly one-third, of Russia's total budget expenditure in 2024.

"The budget's structure shows that the main emphasis is on ensuring our victory — the Army, defense capability, armed forces, fighters. Everything needed for the front, everything needed for victory, is in the budget," explained Russian Finance Minister Anton Siluanov.

But there are questions not only about whether the Kremlin can find the cash to fund such spending but also whether Russia's defense-industrial base will be able to deliver.

The Kremlin started the war with a formidable arsenal, greatly outnumbering Ukraine's air, land and naval capabilities, which initially led many Western observers to believe that Ukraine would be quickly overpowered by the Russian military. Yet Russian losses in the war — both in terms of human casualties and materiel — have also been staggering, forcing Russia to pull aging equipment from its warehouses. The first several months of the invasion demonstrated that significant numbers of Russian-stockpiled equipment used in Ukraine were older and of lesser quality.

Furthermore, replacing equipment is challenging because higher-end Russian weapons systems, including main battle tanks, aircraft and missiles, have traditionally depended on critical components imported from the West, such as optical systems, bearings, machine tools, engines and microchips. The allied

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sanctions and export controls have constrained Russia's access to these items, thus impacting the Kremlin's ability to manufacture advanced weapons and equipment to supply its armed forces.

However, committed adversaries adapt. Russia has demonstrated a remarkable degree of adaptability to Western sanctions. It has established sanction-evading supply chains spanning several regions and continents, from Europe to the Indo-Pacific. It has found alternative suppliers such as China, which has sold millions of dollars' worth of semiconductors, drones and other types of dual-use goods to Russia since 2022.

Russia is also pressing ahead with efforts to increase the domestic production of military hardware, including tanks, rocket launchers, artillery and missiles by more than twofold and, in certain cases, by tenfold — at least according to representatives of Russia's state-owned defense conglomerate Rostec.

The Kremlin's efforts also have limitations and potential pitfalls, ultimately impacting the quality of what Russia can produce. The United States and its allies are continuing to actively target Russia's sanction-evading efforts by constantly expanding the sanctioned individuals and entities lists.

Moscow's pivot to Beijing as an alternative supplier, while undeniably concerning, has its own challenges. According to U.S. Deputy Secretary of the Treasury Wally Adeyemo, China does not yet produce the advanced semiconductors Russia's defense-industrial base requires, and about 40% of the less advanced microchips China sold to Russia have been defective.

Furthermore, the shift toward a war economy creates domestic risks to Putin's government. While increases in state spending on defense have stimulated the economy, that has come at a cost to the budget. The weakening of the ruble makes importing critical components, whether through China or the black market, more expensive. Inflation is rising, stoked by high-priced imports, a pronounced labor shortage and a dramatic increase in government spending on the war.

In addition, Russian arms sales are declining significantly. Russia's

Ilya Pitalev/SPUTNIK/AFP via Getty Images

Military vehicles are seen at a plant of Russian missile manufacturer Almaz-Antey in Saint Petersburg on Jan. 18, 2023.

**" With Moscow's commitment to its war effort, the only way Kyiv will be able to maintain its defenses and retake captured territory from Russia will be through the uninterrupted delivery of Western military aid to Ukraine in 2024."**

military-industrial base has refocused inward by prioritizing supplies for its troops in Ukraine. But this means the defense sector is now bringing in much less revenue and is a major drain on the Kremlin's stretched budget. The Kremlin has started drawing down its rainy day fund to keep factories running. Thus, Russian spending will be all guns and little butter.

These limitations could create internal vulnerabilities on the Russian home front that Moscow will closely watch. The Kremlin put off another round of mobilization to boost manpower for the war, despite being stretched by Ukraine's counteroffensive because of concerns of public backlash. The Russian government will be wary that a sluggish economy paired with high casualties could cause public support for a war of choice.

Ukraine's ability to strike Crimea and Russian cities through its indigenous production of drones is another cause for concern. While the Kremlin's strong autocratic rule may insulate Russian leadership from the whims of public opinion, it can never take its own stability for granted, as demonstrated by Yevgeny Prigozhin's mutiny and the march toward Moscow this summer by his mercenary group Wagner.

Nevertheless, the Kremlin will be able to mass produce weapons, especially low-cost yet tactically effective weapons, such as explosive drones and gliding aerial bombs. This may give Russia an advantage as the war enters 2024, given Western defense production has not ramped up anywhere near the same degree.

With Moscow's commitment to its war effort, the only way Kyiv will be able to maintain its defenses and retake captured territory from Russia will be through the uninterrupted delivery of Western military aid to Ukraine in 2024. Putin remains focused on reorienting Russia's economy to support its defense-industrial base.

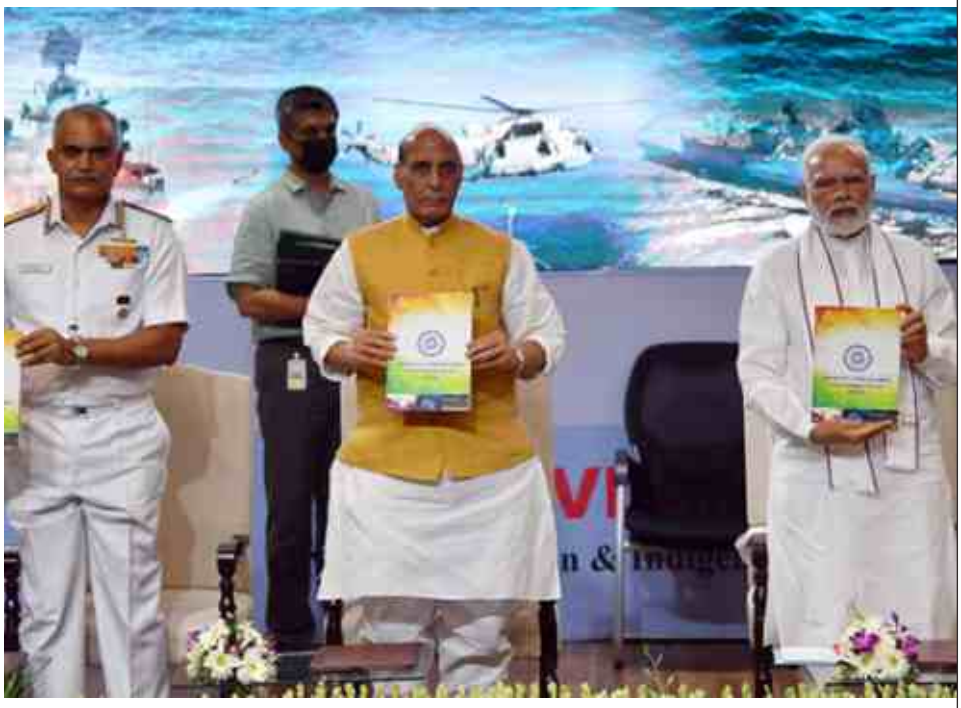
The onus is now on Ukraine's international partners to do the same.

## Defence & Aerospace: 2023 in Review

# Indian Navy Modernisation and Indigenisation

**IMR Special Report**

Indian Navy (IN) has constantly strived towards achieving 'Self-Reliance through Indigenisation' and synchronised the efforts in tandem with various flagship schemes of the Government viz., 'Make', 'Technology Development Fund' and 'Innovation for Defence Excellence', in addition to procurements under the 'Revenue' route. IN has been the torch bearer amongst the three Services to leverage the distinct advantages of Govt schemes and has engaged actively with industry partners including MSMEs and Start-ups, to encourage their active participation in our Indigenisation Programmes.



**The prime minister was the chief guest at 'Swavlamban' seminar of the Naval Innovation and Indigenisation Organisation at New Delhi on 18-19 July 2022.**

**Make Scheme**

IN is pursuing a total of 38 Make projects under Chapter III of DAP 2020. Presently, 26 projects are being steered under Make-II category, 10 projects under Make I category and two projects under Make III Category. In addition, Eight Make II joint projects are being steered with IA and IAF as lead services. Under Make II, AoN has been accorded for 12 projects. Prototype development contracts have been concluded for nine projects (for a cost of Rs 400.84 Cr) and 03 project are at EoI stage. Remaining 14 projects are under various stages of feasibility study/ AIP stage. Under Make I, AoN has been accorded for 02 projects, remaining 08 projects are under various stages of feasibility study/ AIP stage. Under Make III, there are two projects and presently both are at feasibility study stage.

**Technology Development Fund**

In order to introduce cutting edge technology on board IN platforms, 25 projects are being pursued under the 'Technology Development Fund' scheme. Contract has been concluded for 10 projects at a cost of Rs 34.92 Cr. One project is at CNC stage, EOI evaluation is in progress for eight projects, and six projects are at pre-AoN stage.

**Joint iDEX Challenges**

Exchange of various iDEX proposals by both India and US startups under 'India-US Defence Acceleration Ecosystem (INDUS-X)' initiative was commenced in July 2023. Two proposals pertaining to maritime domain were launched by Raksha Mantri in presence of US Ambassador to India Mr Eric Garcetti during the NIIO Seminar.

iDEX Scheme: IN is progressing 41 problem statements under Defence India Startup Challenge (DISC) and Open Challenge (OC) categories through 59 startups.

**Induction of Niche Technologies**

A wide range of niche technologies are being inducted to enhance long range precision attack capabilities. Loitering Munitions in land and sea based versions are being inducted to enhance the targeting capabilities. Additionally, containerised missile systems are being inducted to enhance the operational capability and to augment flexibility in operations.

**'Swavlamban 2023'**

Swavlamban 23 seminar was scheduled at Bharat Mandapa, Pragati Maidan from October 04 to 05, 2023. Day 2 of the seminar focused on interactive session on indigenisation and armament. A dedicated interaction session was scheduled in Session II on the theme, 'Discussion on Swavlamban 2.0 – Indian Navy's Indigenisation Roadmap'. The target audience was primarily manufacturer/ import/ export/ service industry in Defence sector. Nearly 300 industry partners participated in the aforementioned session.

**INS Vagir, fifth Submarine of Kalvari class, was commissioned on 23 January 2023.**

**Indigenisation**

Navy has transformed from a 'Buyers Navy' into a 'Builders Navy', with aircraft carrier, destroyers, stealth frigates, corvettes, submarines and other war vessels being constructed in our country. Today, of the 66 ships under construction 64 are being built in India. Further, AoN has been accorded for 24 ships and submarines that are all planned to be constructed in Indian Shipyards. At present, IN has achieved approximately 90% indigenisation in the Float segment, 60% in the Move segment, and 50% in the Fight segment. Indian Navy is committed to becoming a fully Aatmanirbhar Navy by 2047. As on date, we are on track towards this goal, and 80% of the IN Capital Budget in CFY 2023-24 has been earmarked for domestic procurements in support of GoI vision of ' Aatmanirbhar Bharat'.

**New Shipbuilding contracts in 2023**

Five shipbuilding contracts at a total value of Rs 41,742.37 Cr have been concluded with Indian shipyards. Conclusion of five shipbuilding contracts within span of six months is testimony to the importance being accorded to the Indian Navy by the Govt of India. Construction of 25 ships will generate a total employment of 346.30 lakh man-days over the next one decade and engage numerous MSMEs in the shipbuilding activity.

**Commissioning/ Delivery of Ships**

The ships/submarines which have been commissioned this year, as also the status of shipbuilding projects underway are highlighted below:-

INS Vagir, fifth Submarine of Kalvari class, was commissioned on 23 January 2023.

Maldivian CG Ship Huravee, a Trinkat Class Fast Attack Craft was returned to India by Maldives post handing over INS Tarmugli to Govt. of Maldives in May 2023. The ship, post refit, was re-commissioned into Indian Navy as INS Tarmugli on 14 December 2023.

INS Imphal, the third Ship of Project-15B successfully completed her sea trials followed by Final machinery trials on 25 August 2023. The ship was delivered to the Indian Navy on 20 October 2023 by MDL, Mumbai. The ship is planned to be commissioned on 26 December 2023.

Sandhayak (Yard 3025), the first of the four Survey Vessel (Large) ships was delivered to Indian Navy by GRSE on 4 December 2023. The ship would be commissioned in January 2024.

The third GRSE ship of Project P17A Frigates, Vindhyagiri (Yard 3024), was launched on Aug 17, 2023 at GRSE, Kolkata

The fourth ship of Survey Vessel Large, i.e. Sanshodhak (Yard 3028) was launched on 13 June 2023 at L&T Kattupalli.

Two ASW Shallow Water Craft (ASW SWC) namely Androth (Yard 3035) and Anjadip (Yard 3030) were launched on 21 March and 13 June 2023 respectively at GRSE, Kolkata. Three more ASW SWC namely Mahe (Yard 523), Malvan (Yard 524) and Magrol (Yard 525) were concurrently launched on 30 November 2023 at CSL, Kochi.

The last of the seven P17A ships, i.e. Mahendragiri (Yard 12654) was launched on 1 Sep 2023 at MDL, Mumbai.

1st Diving Support Craft A-20 (Yard-325) was launched on 31 August 2023 at Titagarh Rail Systems Ltd, Kolkata.

## Defence & Aerospace: 2023 in Review

# Army's Operations and Transformation Milestones

**IMR Special Report**

The Indian Army maintained high state of preparedness in 2023 and ensured stability & dominance along all the frontiers including Line of Actual Control (LAC) and Line of Control (LC). Relentless Counter Terrorist operations were also carried out while maintaining high training standards and constantly reviewing emerging & future threats to national security.

**Army jawans in counter-insurgency operations in Kuthipora village, Kashmir**

### Operational Preparedness

**Northern Borders.** As part of diplomatic and military efforts concerning ongoing standoff along the LAC, 20 rounds of Corps Commander Level Meetings and 14 related Working Mechanism for Consultation and Coordination (WMCC) meetings were held with the Chinese. Both sides agreed to maintain the momentum of dialogue and negotiations through the relevant military and diplomatic mechanisms. Indian Army has exercised the established border mechanisms to maintain peace and tranquillity along the LAC in all sectors.

**LoC & Counter-Terrorist Ops.** After the understanding of February 2021, between the Directorate Generals Military Operation of India and Pakistan, the situation along the Line of Control improved significantly compared to pre-understanding violence levels. Relentless operations conducted in synergy with other agencies resulted in successful and incident-free conduct of international and national level events such as G-20 meetings and Amarnath Yatra with 4.45 Lakh yatris visiting the shrine. Synergised counter-terrorist operations also resulted in elimination of 34 terrorists and apprehension of four terrorists in the hinterland. 18 infiltration bids were eliminated on LC in which 36 terrorists were killed besides recovery of large war-like stores.

**North East.** The balanced posture of firm and compassionate outlook by the Indian Army & Assam Rifles in militancy affected North Eastern part of the country is evident through both tangible & intangible outcomes. This is reflected by results in operations against militant groups, mainstreaming of militants and the critical decision of the Government of India to reduce areas under Armed Forces Special Powers Act (AFSPA-1958). Since 1 January 2023, synergised efforts by Army, Assam Rifles and State Police resulted in neutralisation of three cadres, apprehension of 233 cadres, surrender by 186 cadres of various militant groups and recovery of 271 weapons of different types. Security Forces also continued with the earnest endeavour to reduce the drug menace in the region. Indian Army along with Assam Rifles, Police & Civil administration, successfully recovered narcotics & contraband worth Rs 1,567.55 crore during the year in the hinterland as well as India-Myanmar Border.

**Manipur.** Indian Army and Assam Rifles have played a key role in controlling the internal security situation in Manipur and saving precious lives, property and evacuating approximately 35,000 internally displaced population to safety. Security Forces have been assisting the civil administration and other security agencies with a neutral and transparent approach to restore peace and normalcy in the State.

### Year of Transformation

2023 was the Year of Transformation for the Indian Army. The process of transformation hinges on the five pillars- 'Force Structuring & Optimisation', 'Modernisation & Technology Infusion', 'Systems, Processes & Functions', 'Human Resource Management' and 'Jointness & Integration'.

**Force Restructuring & Optimisation.** Efforts towards jointness and integration preceding Theaterisation are being made with renewed impetus.

Reorganisation of Early Warfare (EW) and Electronic Intelligence units under EW Brigades has been formalised. Raising of additional EW Battalions is under progress.

Reorganisation of Surveillance and Target Acquisition (SATA) units is underway.

Outsourcing of Non-Core Services is under progress to realign combat manpower for core

**The COAS Gen Manoj Pande at MCTE on 15 Nov 2023 to review progress in use of AI, Quantum Technology, including 5Gi and Electromagnetic Spectrum Operations**

tasks.

**Modernisation & Technology Infusion.** A roadmap has been put in place for Upgrades, New Acquisitions & infusion of Niche technology. The right balance between 'Conventional' and 'New' capabilities is being maintained. A focussed approach is being followed to ensure timely & pragmatic trials.

**Conclusion of 85 Capital Contracts.** A total of 85 Capital Contracts worth Rs 12,343 crore have been concluded in current Financial Year. This will boost the Capability of Indian Army in the domain of mobilisation, firepower, communication/non communication, Intelligence, Surveillance & Reconnaissance (ISR) & Drone/Counter-Drone Systems.

**Induction of Niche Technology through iDEX.** Four Projects worth Rs 70 crore have been contracted this year, thereby paving the way for the induction of Niche Tech in communication, ISR & stealth Technology. It is also a step towards providing impetus in developments favourable to defence eco system.

**Exploiting 5G/6G and Artificial Intelligence.** Indian Army has collaborated with the Ministry of Electronics and Information Technology to develop advanced electronics and infrastructure, aligning with Digital India and Make in India initiatives. 5G laboratories have been established at various locations including Military College of Telecommunication Engineering (MCTE). In addition, Military grade 5G and 6G laboratories are being established at various locations. MCTE has been developed as a key Centre of Excellence for Artificial Intelligence.

**Emergency Procurements.** The EP were utilised to augment capability along the Northern and Western Front besides catering for training aggregates. The equipment procured under the EP are being fully exploited by field formations to refine their operational philosophy, TTPs and maintenance support requirements. In Financial Years 2020-22, 68 projects, worth Rs 6,592 crore were procured while 73 projects, worth Rs 11,000 crore have been procured in the Financial Years 2022-24.

**System, Processes & Functions.** The following has been achieved under the pillar of System, Processes & Functions:

**Right-sizing and Ease of Doing Business.** Digital initiatives have been undertaken in a major way to effect improved efficiencies in domains of Operational Enablement.

**National Logistics Policy & PM Gati Shakti National Master Plan.** The Indian Army has been an important partner in the Prime Minister Gati Shakti National Master Plan and formulation of NLP. Efforts have been made to align initiatives undertaken by the Indian Army to the national vision. 180 Officers have been trained on Integrated Government Online Training (iGOT) Karmayogi platform and additional training with BISAG-N is being planned. A Tri- Services Geographic Information System (GIS)-based Infrastructure Portal akin to PM Gati Shakti is being created under the aegis of Headquarters Integrated Defence Staff.

## Defence & Aerospace: 2023 in Review

# Defence Research & Development

**IMR Special Report**

During 2023, the Defence Research & Development Organisation achieved many breakthroughs and completed a number of projects.

**Akash-NG**

Flight trial of new generation Surface-to-Air Missile (SAM) Akash-NG was conducted against a Banshee target from the Integrated Test Range (ITR), Chandipur, Odisha. It is meant for use by Indian Air Force (IAF) with the aim of intercepting high manoeuvring low RCS aerial threats. The system has been developed with better deployability compared to other similar systems with canisterised launcher and much smaller ground system footprint.

**ITCM Missile**

Indigenous Technology Cruise Missile (ITCM) is a new generation 'Long Range Land Attack Cruise Missile' being developed for land and sea platforms. Flight trial was conducted on 21 Feb 2023 form the ITR Balasore, Odisha.

**Maiden test of ASTRA BVRAAM Missile**

ASTRA is a state-of-the-art Beyond Visual Range 'Air-to-Air missile' to engage and destroy highly manoeuvring supersonic aerial targets. Light Combat Aircraft (LCA) Tejas, successfully fired the ASTRA indigenous BVR air-to-air missile.

**Man-Portable Anti-Tank Guided Missile**

MPATGM is a 3rd generation ATGM with 'Fire & Forget' and 'Top Attack' capabilities with day and night operational capability. Flight trials of MPATGM was conducted for a range of 2.5 Km at NOAR, Kurnool.

**Very Short Range Air Defence System**

VSHORADS is a 4th generation Man Portable Air Defence System system. It employs state-of-the-art uncooled imaging infrared seeker. The missile was flight-tested against high speed unmanned aerial targets, simulating approaching and receding aircraft from ITR Chandipur, off the coast of Odisha.

**Medium Range Surface to Air Missile for Indian Navy**

MRSAM for the Indian Navy is a joint development programme of DRDO and Israeli Aerospace Industries (IAI), Israel. The weapon system provides a point and area defence for P15A ships of the Indian Navy against a vast variety of aerial threats including fighter aircrafts, subsonic and supersonic missiles, etc. The Indian Navy successfully flight-tested MRSAM from Visakhapatnam.

**DRDO and Indian Navy successfully conducted a maiden flight trial of sea-based endo-atmospheric interceptor missile on 22 April 2023**

**Heavy Weight Torpedo**

Indigenously Designed and Developed (IDD) Heavy Weight Torpedo 'Varunastra' was successfully test-fired with a live warhead against an undersea target by Indian Navy. 'Varunastra' is a ship-launched anti-submarine torpedo having low drift navigational systems, acoustic homing, advanced acoustic counter measure features, autonomous guidance algorithms, insensitive munitions warhead and a GPS-based recovery aid for practice torpedo.

**Vertical Launch Short Range Surface to Air Missile**

VL-SRSAM is a vertical launch short range surface to air missile having a strike range upto 80 km for Fighters aircraft, helicopter, UAVs, etc. The missile has been developed for the Indian Navy for neutralizing various aerial threats at close ranges including sea-skimming targets. The missile was flight tested from ITR Chandipur.

**BrahMos**

BrahMos is a two stage precision strike supersonic cruise missile, operating on fire and forget principle, which can be launched from multiple platforms (at air, sea and ground) against land and sea targets. Indian Army test-fired land attack version of extended range BrahMos supersonic cruise missile. Indian Navy with DRDO test-fired two consecutive sea attack version of extended range BrahMos supersonic cruise missile.

**Solid Fuel Ducted Ramjet Technology**

The state-of-the-art air-to-air missile powered with 'SFDR' propulsion for Air Launched Tactical Missiles (ALTM) enables the missiles to intercept aerial threats at very long range at supersonic speeds and is configured with nozzle-less booster, thrust modulation system and sustainer to deliver specific impulse in ramjet mode. The missile was flight tested in 2023.

**Long Range – Anti Ship Missile**

DRDO is engaged in development of technologies required for Long Range Anti-Ship Missile weapon systems capable of engaging a warship with a long range. The missile was flight-tested from ITR.

**Autonomous Flying Wing Technology Demonstrator**

DRDO has successfully carried out a flight trial of Autonomous Flying Wing Technology Demonstrator, an indigenous high-speed flying-wing Unmanned Aerial Vehicle (UAV) from the Aeronautical Test Range, Chitradurga. With this flight in the tailless configuration, India has joined the elite club of countries to have mastered the controls for the flying wing technology. he aircraft prototype, with a complex arrowhead wing platform, is designed and manufactured with light-weight carbon composite material developed indigenously.

**Integrated Life Support System**

Indigenously designed and developed ILSS for pilot of LCA Tejas was flight-tested twice in February. The successful testing is an initial step to mark the country's presence in elite club of four nations possessing the complex ILSS technology.

**Military Combat Parachute System**

A successful live parachute jump trial was conducted in April and September from 10,000 ft was successfully conducted at Drop Zone Malpura, on indigenously-designed Military Combat Parachute System 'HANS' (High Altitude parachute with Navigation & advanced Sub-assemblies)' to meet the military operational requirements of Indian Armed Forces. HANS enables Special Forces to undertake para jump along with all necessary combat sub-assemblies and will replace all existing systems for free fall operations.

**Air Droppable Container**

DRDO has designed and developed Air Droppable Container (ADC-150) with a pay load capacity of 150kg to enhance the naval operational logistic capabilities. ADC-150 will provide quick response to meet the requirement of critical engineering stores of ships under distress & far away from the coast. DRDO & Indian navy conducted the successful maiden test of ADC-150 dropped from IL38DF aircraft.

**Crew Module Parachute System for Gaganyaan Programme**

CMPS was successfully demonstrated In-flight Abort Demonstration of Crew Escape System with the newly developed Test Vehicle followed by Crew Module Separation & safe recovery using parachute system developed by DRDO.

**Naval Anti-Ship Missile – Short Range**

NASM-SR missile is powered by two stage solid propulsion system with an in-line ejectable booster and a long-burn sustainer. DRDO successfully flight tested the missile from ITR in November. The missile was tested for a range of 35 km, using an indigenous IR Seeker for its Terminal Guidance in 'Lock-on after Launch' mode.

**DRDO conducted a flight trial of the autonomous flying wing technology demoonstrator on 22 Dec 2023**

**Fuel Cell-based Air Independent Propulsion system**

The system of DRDO's Naval Materials Research Laboratory will soon be fitted onboard INS Kalvari. An agreement was signed between senior officials of NMRL and Naval Group France to extend cooperation to enter into the detailed design phase for integration of indigenous AIP in the Kalvari class submarines. As part of the agreement, Naval Group France will certify the AIP design for integration in the submarines. The AIP has a force multiplier effect on lethality of a diesel electric submarine as it enhances the submerged endurance by several folds.

**Technology Development Fund**

The TDF scheme encourages participation of public/private industries especially MSMEs and start-ups, so as to create an eco-system for enhancing cutting edge technology capability for defence application. Further, the Scheme funds industries up to an amount of Rs 50 crore per project for innovation, R&D of defence technologies in the field of defence and Aerospace.

**Transfer of Technology**

DRDO has carried out more than 1,600 ToTs to Indian Industry including both Private and public. ToT is being carried out as per the policy and procedure approved by RM. DcPP/PA/DP of DRDO are given Technology free of cost i.e at "Nil ToT Fee".

**DRDO Patents**

DRDO has a Policy for Free Access of DRDO Patents by Indian industries. This is likely to increase the technological capabilities of industries and enhance their competitiveness in global supply chain. 1,700 IPRs have been opened to Indian Industries.

**Dare to Dream Innovation Contest**

It aims to promote innovators and start-ups are being conducted. Three versions of contests have been concluded. Dare to Dream 4.0 was also launched in January for individual and Start-ups to unearth disruptive ideas and concepts in emerging technologies identified by DRDO for enhancing defence capabilities. Development cum Production Partner/ Production Agency identified for more than 105 systems.

**Partnership with industry**

DRDO has been partnering with industry for the realization of its systems. Collaborating with DRDO in the development of major weapon systems, the Indian industry has matured to a stage where they can develop systems on their own. Indian industry has progressed from a 'build to print' partner to 'build to specification' partner. DRDO test facilities have been opened to the industries for utilisation. Segments like Missiles, Bombs etc. have been opened to private industries for development.

**Academia**

DRDO provides support to academia to carry out directed research in the identified research areas through DRDO Industry Academia - Centres of Excellence to undertake translational projects by providing direction, technical interactions and project funding. So far, 15 DIA-CoEs have been established. They are at IITs (BHU, Jodhpur, Kanpur, Roorkee, Kharagpur, Hyderabad, Delhi, Bombay, Madras), Gujarat University, IISC Bengaluru, Jammu University, Mizoram University, University of Hyderabad and Bharathiar University.

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DEFENCE REVIEW

## Defence & Aerospace: 2023 in Review

# Atmanirbharta in Defence

**IMR Special Report**

2023 was a landmark year for Ministry of Defence (MoD) as giant strides were made towards realising the vision of the Government to create a strong, secure, self-reliant, and inclusive India. Efforts to achieve 'Aatmanirbharta' in defence and Armed Forces modernisation surged ahead with renewed thrust, with the country witnessing record defence exports and all-time high defence production.

**Positive Indigenisation Lists**

Fifth Positive Indigenisation List (PIL) of Department of Military Affairs (DMA) comprising 98 items was released by Raksha Mantri Shri Rajnath Singh during the plenary session of 'Swavlamban 2.0'. The list includes Highly complex systems, sensors, weapons and ammunition have been included in the list. All these items will be procured from indigenous sources as per provisions given in Defence Acquisition Procedure 2020 in staggered timeline. The DMA had earlier promulgated four PILs comprising 411 military items. Separately, the Department of Defence Production (DDP) has notified four PILs consisting of a total of 4,666 items, including Line Replacement Units/Sub-systems/Spares & Components for DPSUs. The fourth PIL of 928 items was released by DDP in 2023.

**Record Defence Production**

The value of defence production in Financial Year (FY) 2022-23 crossed the figure of Rs one lakh crore for the first time ever. It was Rs 95,000 crore in FY 2021-22. The Government is continuously working with defence industries and their associations to remove the challenges faced by them and promote defence production in the country. A number of policy reforms have been taken to achieve the objective of ease of doing business, including the integration of MSMEs and start-ups into the supply chain. Due to these policies, the industries, including MSMEs and start-ups, are forthcoming in defence design, development & manufacturing and there is almost a 200% increase in the number of defence licenses issued to the industries in the last 7-8 years by the Government.

**Record Defence Exports**

Through consistent policy initiatives of the Government and tremendous contribution of the defence industry, defence exports reached an all-time high of approx. Rs 16,000 crore in FY 2022-23, almost Rs 3,000 crore more than the previous financial year. It a rise of over 10 times since 2016-17. India is now exporting to over 85 countries. Indian industry has shown its capability of design and development to the world, with 100 firms exporting defence products at present. Major platforms being exported include Dornier-228, 155 mm Advanced Towed Artillery Guns, Brahmos Missiles, Akash Missile System, Radars, Simulators, Mine Protected Vehicles, Armoured Vehicles, PINAKA Rockets & Launchers, Ammunitions, Thermal Imagers, Body Armours, besides Systems, Line Replaceable Units and Parts & components of Avionics and Small Arms. There is growing global demand of LCA-Tejas, Light Combat Helicopters, Aircraft Carrier, MRO activities etc.

**Separate Budget for Domestic Industry**

Record 75 per cent (approx. Rs one lakh crore) of the defence capital procurement budget was earmarked for domestic industry in FY 2023-24, up from 68 per cent in 2022-23. This was announced by the Raksha Mantri during 14th Aero India in Bengaluru. In FY 2023-24, Ministry of Defence was allocated a total Budget of Rs 5.94 lakh crore, which is 13.18 per cent of the total budget (Rs 45.03 lakh crore). Capital outlay pertaining to modernisation and infrastructure development was increased to Rs 1.63 lakh crore.

**HAL Helicopter Factory**

Hindustan Aeronautics Limited (HAL) Helicopter Factory was dedicated to the nation by Prime Minister Shri Narendra Modi at Tumakuru in Karnataka. The factory is India's largest helicopter manufacturing facility and will initially produce Light Utility Helicopters (LUHs). The LUH is an indigenously designed and developed three-ton class, single engine multipurpose utility helicopter with unique features of high manoeuvrability. Initially, the factory will produce around 30 helicopters per year and can be enhanced to 60 and then 90 per year in a phased manner.

**LCA Tejas**

HAL handed over the first twin-seater Light Combat Aircraft 'Tejas' to the IAF in the presence of Rakha Rajya Mantri Shri Ajay Bhatt in Bengaluru. It is a light weight, all weather multi-role 4.5 generation aircraft, designed to support the training requirements of the IAF and augment itself to the role of a fighter in case of necessity. It is an amalgamation of contemporary concepts and technologies such as relaxed static-stability, quadraplex fly-by-wire flight control, carefree manoeuvring, advanced glass cockpit, integrated digital avionics systems and advanced composite materials for the airframe. The IAF placed an order for 83 LCAs with HAL.

**C-295 Transport Aircraft**

First C-295 MW transport aircraft was formally inducted into the Indian Air Force in the presence of Raksha Mantri Shri Rajnath Singh. The aircraft are being inducted through a collaboration between Tata Advanced Systems Limited and Airbus Defence and Space S.A., Spain. Fifteen more aircraft will be delivered in flyaway condition and they are scheduled to be received till August 2025. Remaining forty will be manufactured at the C-295 transport aircraft manufacturing facility, the foundation stone of which was laid by the Prime Minister in Vadodara, Gujarat in October 2022. The first Made in India aircraft is expected from September 2026. This medium lift tactical aircraft, which is capable of taking off and landing from unprepared landing grounds, will replace the HS-748 Avro aircraft.

CEREMONIAL

# Battle Honours and Raising Day Anniversaries

## Best wishes from IMR for anniversaries in January 2024

**1 January**
39 Gorkha Training Centre
11 Gorkha Rifles Regtl Centre
71 Armoured Regiment
29 Air Defence Regiment (Samba)
109 Light Air Defence Regiment (SP)
66 Engineer Regiment
662 R & O Squadron
663 R & O Squadron
17 R & O Flight
417 (I) Field Company
7 Guards
10 Guards
12 Mech Infantry (16 Mahar)
13 Mech Infantry (18 Rajput)
16 Mechanised Infantry
8 Grenadiers
14 Grenadiers
9 Jat
8 Sikh
6 Garhwal Rifles
9 Garhwal Rifles
13 Garhwal Rifles
11 Garhwal Rifles
24 Punjab
18 Punjab
5 Madras
12 Madras
26 Madras
6 Rajput
25 Rajput
10 Sikh Light Infantry
12 Sikh Light Infantry
8 Kumaon
9 Kumaon
18 Kumaon
20 Kumaon
42 Armoured Regiment
70 Armoured Regiment
83 Armoured Regiment
5 Assam
7 Assam
8 Bihar
12 Bihar
6 Mahar
12 Mahar
18 Mahar
4/1 Gorkha Rifles
5/1 Gorkha Rifles
5/4 Gorkha Rifles
4/5 Gorkha Rifles
5/9 Gorkha Rifles
3/11 Gorkha Rifles
7/11 Gorkha Rifles
14 J&K Rifles (Now Ladakh Scouts)
15 Jammu & Kashmir Rifles

**2 January**
3 Cavalry
55 Engineer Regiment

**4 January**
13 Guards

**8 January**
15 Mahar

**9 January**
6 Jammu & Kashmir Rifles

**10 January**
Army Air Defence Corps Day
3 Guards (1 Rajputana Rifles)

**11 January**
4 Rajput
11 Jammu & Kashmir Rifles
2/11 Gorkha Rifles

**13 January**
14 Guards

**14 January**
HQ 137 Works Engineers
873 Engineer Works Section

**15 January**
ARMY DAY
1 Field Regiment (SP)
23 Mountain Regiment
22 Punjab
19 Madras
16 Madras (Cochin)
15 Grenadiers
13 Rajputana Rifles
21 Rajput
4 Jat
7 Dogra
17 Kumaon
12 Kumaon
13 Mahar
14 Mahar
12 Jammu & Kashmir Rifles
2/3 Gorkha Rifles

**16 January**
9 Punjab
9 Rajput

**25 January**
5 Rajput

**26 January**
9 Dogra
2/5 Gorkha Rifles - VC Day,
Mortar Bluff Day

**28 January**
581 Field Survey Engineer Group
130 AD Regiment
5 Bihar

**29 January**
16 Sikh

**31 January**
33 R & O Flight
17 Engineer Regiment
415 (I) Engineer Squadron
418 (I) Field Company
Bombay Engineers Group - VC Day

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**EDITORIAL**
**Chief Editor:** Maj Gen RK Arora, rk.arora@imrmedia.in
**Editor:** Maj Gen Dr GD Bakshi, SM, VSM, Retd
geedee@imrmedia.in
**Associate Editors**
Air Marshal Bharat Kumar, PVSM, AVSM, Retd
Maj Gen Deepak K. Mehta, Retd.
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**EVENTS**
Indronil Banerjee 91-9818984664 (indronil@imrmedia.in)

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Shammi Mehra - subscriptions@imrmedia.in +91-9582649663

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**CONTACT US**
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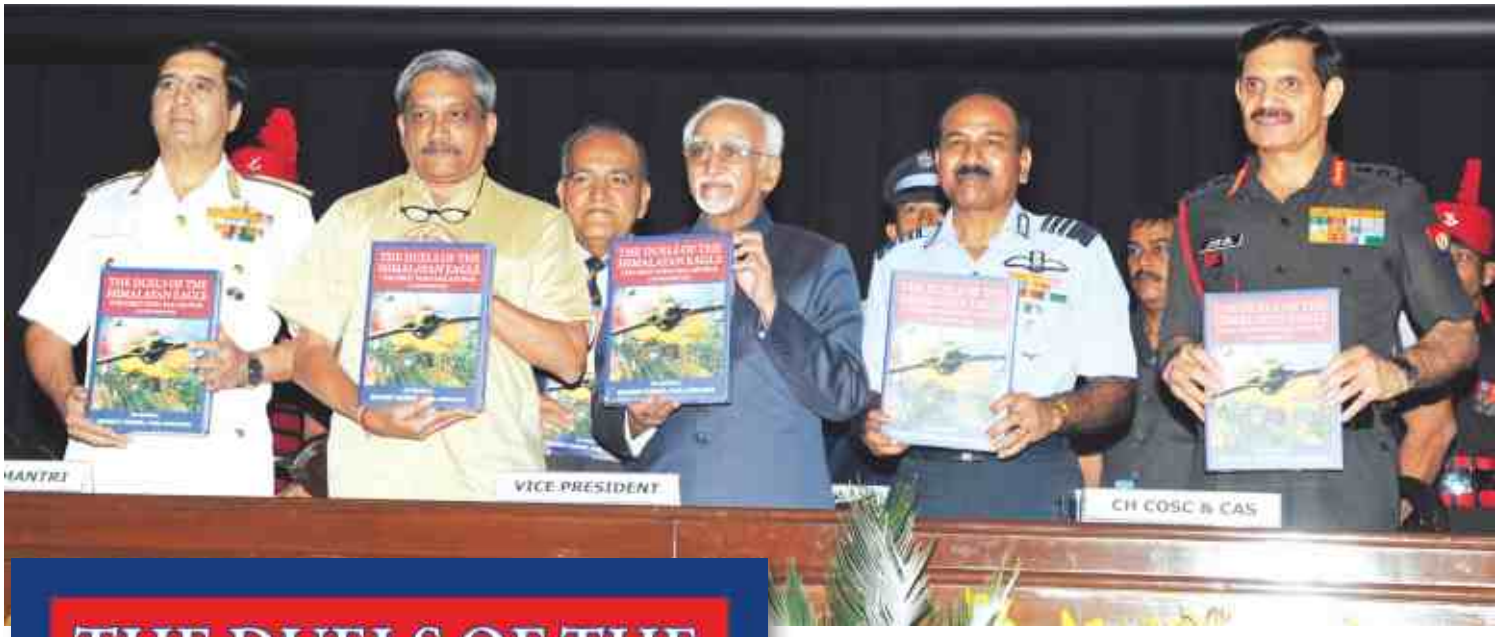
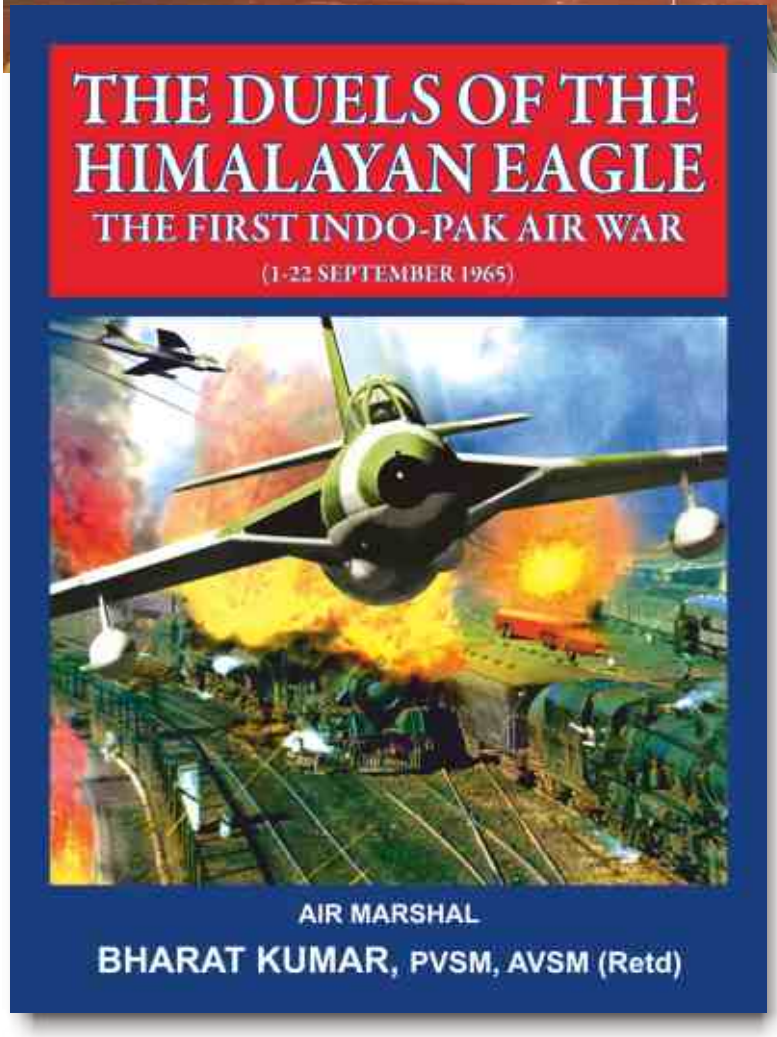
# A 'Must Have' for Every Formation and Unit

## Book on 1965 War commissioned by the IAF




The Duels of the Himalayan Eagle was released by the Vice President, the Defence Minister and the Service Chiefs on 1 September.




320pp, hardcover, illustrated. Rs 1800 (Speedpost charges incl)

### Foreword by
### Air Chief Marshal Arup Raha
### Chief of the Air Staff

*The Duels of the Himalayan Eagle* describes the First Air War between India and Pakistan. Commencing from an analysis of the two air forces and their concept of operations, every significant aerial and ground engagement has been covered in detail. These include Pakistani raids on Pathankot and Kalaikunda, Indian ventures into Sargodha, Badin and Peshawar as well as various aerial engagements. These stories are based on the narratives of the air warriors involved in the operations or records maintained on a daily basis in the squadron diaries by various units during the period of the War.

Pakistani disastrous para drops near Pathankot, Adampur and Halwara in the West and Gauhati in the East have been covered in detail. The travails narrated by seven air warriors, who became POWs have also been included.

Finally, the author has dissected the entire air war and has put down his own conclusions – probably the first such attempt by an Indian author.

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# 2024


| | |
|---|---|
| Surveillance & Electro-optics | - 22 March 2024. |
| Force Protection (Perimeter, Ballistic & CBRN) | - 26 April 2024. |
| UAS and C-UAS India 2024 | - 17 May 2024. |
| Military Airlift and Refuelling | - June 2024. |
| Air & Missile Defence India 2024 | - 19 July 2024. |
| Defence & Aerospace B2B & B2G Partnership Day | - 17 August 2024. |
| National Seminar on Defence Logistics | - 17 September 2024. |
| Avionics & Combat Support | - October 2024. |
| Advanced Materials & 3D Printing for Defence | - 8 November 2024. |
| Military Power Supply Systems | - 6 December 2024. |

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Contact: Indronil Banerjee. +91-9818984664 | indronil@imrmedia.in