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India successfully conducts trial of indigenously made Prithvi-2 missile

The flight test of the surface-to-surface missile was carried out barely a fortnight after two back-to-back trials of the Prithvi-2 were conducted successfully at night from the same base on Nov 20

Balasore: India on Tuesday successfully conducted another night trial of its indigenously developed nuclear capable Prithvi-2 missile as part of a user trial for the armed forces from a test range in Odisha coast, a defence source said.

The flight test of the surface-to-surface missile was carried out barely a fortnight after two back-to-back trials of the Prithvi-2 were conducted successfully at night from the same base on November 20.

"Today's trial of Prithvi-2 missile was successful and the test met all parameters. It was a routine trial," the source said.

The trial of the surface-to-surface missile, which has a strike range of 350 kilometres, was carried out from a mobile launcher of the Integrated Test Range (ITR) at Chandipur near here at around 7.50 pm.

Prithvi-2 is capable of carrying 500-1,000 kilograms of warheads and is powered by liquid propulsion twin engines. The state-of-the-art missile uses an advanced inertial guidance system with manoeuvring trajectory to hit its target, the source said.

The missile was randomly chosen from the production stock and the entire launch activities were carried out by the Strategic Force Command (SFC) of the armed forces and monitored by the scientists of Defence Research and Development Organisation (DRDO) as part of a training exercise.

"The trajectory of the missile was tracked by radars, electro-optical tracking systems and telemetry stations by the DRDO along the coast of Odisha," said the source.

The downrange teams onboard the ship deployed near the designated impact point in the Bay of Bengal monitored the terminal events and splashdown.

Already inducted into the armoury of the defence forces in 2003, the nine-metre-tall, single-stage liquid-fuelled "Prithvi" is the first missile to have been developed by the DRDO under the Integrated Guided Missile Development Programme (IGMDP).

https://www.business-standard.com/article/pti-stories/india-conducts-fresh-night-trial-of-prithvi-2-missile-119120301437_1.html

परमाणु आयुध ले जाने में सक्षम पृथ्वी-2 का परीक्षण

जासं, बालासोर : भारत ने मंगलवार देर शाम देश में निर्मित और परमाणु आयुध ले जाने में सक्षम पृथ्वी-2 मिसाइल का ओडिशा के चांदीपुर परीक्षण केंद्र से सफल परीक्षण किया। सतह से सतह पर 350 किलोमीटर तक दुश्मनों पर वार करने की क्षमता वाली इस मिसाइल को देर शाम करीब 7:45 पर चांदीपुर स्थित एकीकृत परीक्षण केंद्र आइटीआर के प्रक्षेपण परिसर-3 से दागा गया। पृथ्वी-2 मिसाइल 500 से 1000 किलोग्राम तक आयुध ले जाने में सक्षम है। यह दोहरे इंजन वाली तरल प्रणोदक (लिक्विड प्रपल्शन इंजन) से चालित है। इस अत्याधुनिक मिसाइल में लक्ष्य को भेदने के लिए आधुनिक खास दिशा निर्देशक प्रणाली लगी है और यह अपने प्रक्षेप पथ पर बड़ी कुशलता से बढ़ती है। इसकी समूची प्रक्षेपण गतिविधियों को सेना की रणनीतिक बल कमान ने अंजाम दिया है, जबकि रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) के वैज्ञानिकों ने निगरानी की। इसे 2003 में भारतीय सेना में शामिल किया गया था।

Indian Air Force to get deadly Akash missiles! Places order for 7 squadrons of Made-in-India missile system

The Missile System which has been designed and developed by the Defence Research and Development Organisation (DRDO) and produced and commissioned by Bharat Dynamics Limited (BDL), Bharat Electronics Limited (BEL) has been performing well in integrated Air Defence (AD) exercises conducted from time to time by IAF

By Huma Siddiqui

New Delhi: Satisfied by the consistent and reliable performance by the indigenous Akash Missile System, Surface to Air Missile (SAM) an additional order for seven more squadrons have been placed by the Indian Air Force recently. This is by far the highest order placed by the service for the Akash Missile System.

The Missile System which has been designed and developed by the Defence Research and Development Organisation (DRDO) and produced and commissioned by Bharat Dynamics Limited (BDL), Bharat Electronics Limited (BEL) has been performing well in integrated Air Defence (AD) exercises conducted from time to time by IAF.

The number of missiles fired in Ex- Vayu Shakti 2019 or Crossbow-18, the Akash Missile System had successfully intercepted and destroyed unmanned aerial targets.



In Ex Crossbow-18 the indigenous Akash Missile System was fielded along with imported SAM weapon system under integrated Air defence operations and it surpassed all expectations. The made in India Akash Weapon System has proved its performance capability and reliability which has been successfully demonstrated by the IAF.

There were some teething problems related to extensive field usage faced by squadrons based in the North East and after several rounds of meetings between the user, DRDO and the defence PSUs BDL and BEL and other agencies involved, a mechanism has been evolved to carry out the maintenance together. However, due to the inclement weather in North East, there have been delays in carrying out the repairs.

To a question about serviceability and maintainability of the system, a former IAF officer explained “The BDL/BEL are Defence PSUs and are responsible for the maintainability of the system. There is no design issue with the system which has been designed and developed by DRDO.” And, “a proper ecosystem has been evolved between the user –IAF, DRDO, BEL/BDL from development to commissioning.”

In case of any faults, proper investigations are carried out by DRDO and issues resolved with the joint efforts of the user IAF, BEL/BDL, and other agencies which also included design change.

Sources said that prototypes were made and tested in one equipment and after successful testing and clearance by Quality Assurance (QA), produced in the required quantity and retrofitted in equipment

in unit locations. The Missile system comes with combat ground systems which are directly responsible for engaging the threat and supporting ground systems to facilitate the readiness of the combat systems.

Dismissing reports in a section of the media about the systems which are supporting ground system, sources said that “maintenance is not carried out by DRDO but the Defence PSUs. However, design solutions towards the main combat systems are given high priority and addressing the issues related to the other supporting ground system was taken simultaneously.”

<https://www.financialexpress.com/defence/indian-air-force-to-get-deadly-akash-missiles-places-order-for-7-squadrons-of-made-in-india-missile-system/1783341/>



Wed, 04 Dec 2019

Will take DRDO's new deck-based fighter aircraft when it's ready: Navy Chief

Indigenous Aircraft Carrier Vikrant expected to be operational by 2022

By Dinakar Peri

New Delhi: The Defence Research Development Organisation (DRDO) has offered to develop a new twin-engine deck-based fighter aircraft for the Navy based on the experience of the Naval Light Combat Aircraft (LCA) and it should be ready by 2026, Navy Chief Admiral Karambir Singh said on Tuesday. He also noted that the Navy expected to have the first Indigenous Aircraft Carrier (IAC-1) Vikrant operational by 2022.

“The Qualitative Requirements [QR] are being made. They said they should be able to push it out by 2026. If it meets our time and QR requirements, we will definitely take it [fighter aircraft],” he said at the customary annual press conference ahead of the Navy Day.

In the case of the Naval LCA, it recently successfully completed the take-off and landing trials on the Shore Based Test Facility (SBTF) in Goa.

Adm. Singh said the current LCA Mk-1 was a technology demonstrator and it would further be put to carrier compatibility tests. And if it worked, whatever lessons they had learnt the DRDO would plough back into the twin-engine deck-based fighter that they were offering now.

‘Three IACs needed’

On the requirement for a third aircraft carrier, Adm. Singh said, “As the Navy Chief, I am convinced the country requires three aircraft carriers so that two are operational at any given time.”

He said they were preparing the case for IAC-2 and finalising the requirements. After this, they would go to the government for Acceptance of Necessity (AoN) and it would be followed by design consultancy to decide the exact contours. As of now, the Navy envisaged it to be 65,000 tonnes with Catapult Assisted Take Off But Arrested Recovery (CATOBAR) and full electric propulsion.

On the IAC-1, which is under advanced stage of construction in Kochi, Adm Singh said all ship-building issues “are over” and trials would begin now. “We are almost certain that we will take delivery by February-March 2021, he stated and added that aviation trials would take a year after that. “We should have a fully operational carrier by 2022.”

Largest multilateral exercise

The Navy is scheduled to host its largest multilateral exercise, MILAN off the coast of Visakhapatnam in March 2020, for which 41 countries have been invited. So far, over 15 countries have confirmed their participation. China has not been invited.

Asked why China had been left out, Adm. Singh said they invited “like-minded” countries with whom India had interacted earlier. “We called people who we think are like-minded and this is our first attempt at such a large multilateral exercise. We have not even done Passage Exercises with the Chinese Navy so far. Others we have had much better interoperability,” he stated.

To a question if the Navy would have an exercise with China given recent improvement in relations, Adm. Singh said, “That’s beyond my pay grade.”

Stabilising influence

On the Indian Navy’s role in the Indian Ocean Region (IOR), Adm. Singh said, “Our intention is to have a stabilising influence and not a military influence in the region. When we had a dispute on the international maritime boundary line with Bangladesh, we resolved it through the Permanent Court of Arbitration (PCA). On the other hand, in the South China Sea (SCS), we know what’s happening.” He was referring to the 2016 PCA verdict in favour of the Philippines that was rejected by China.

Chief of Defence Staff

Asked about his expectations on the soon-to-be-created post of Chief of Defence Staff (CDS), Adm. Singh said the views of the Services had been taken care of by the Chairman, Chiefs of Staff Committee (COSC), who then became part of the Implementation Committee. The committee has submitted its report to the government. It should be an empowered CDS, which would be able to make a difference, he said. “I hope the CDS is suitably empowered to carry out all the responsibilities that he is given.”

<https://www.thehindu.com/news/national/will-take-drdo-new-deck-based-fighter-aircraft-when-its-ready-navy-chief/article30149489.ece>

ThePrint

Wed, 04 Dec 2019

Navy’s Tejas aims for first-ever take-off from aircraft carrier Vikramaditya

*DRDO & its Aeronautical Development Agency are aiming to pull off the
maiden flight of naval Tejas from Vikramaditya as a technology demonstration*

By Snehash Alex Philip

New Delhi: Having successfully tested the naval version of Light Combat Aircraft (LCA) Tejas, armed with four air-to-air missiles, the Defence Research and Development Organisation (DRDO) and its Aeronautical Development Agency (ADA) now aim to pull off the aircraft’s maiden flight from India’s only aircraft carrier Vikramaditya.

The flight will serve as the ultimate technology demonstration for the Tejas even as the DRDO looks to develop a twin-engine aircraft that will become the mainstay of operations onboard aircraft carriers.

The trial, however, will take some time as a few more tests have to be carried out, DRDO sources told ThePrint.

“It (carrier-based test) is not too far. Extra safety is being taken and hence time is being consumed,” a DRDO source said.

The Navy said the project is being driven by the ADA and the DRDO, and the Vikramaditya will be made available whenever the test needs to be carried out.

Last week, in a major boost for its capability expansion, the DRDO successfully integrated the naval version of Tejas with two beyond visual range (BVR) missiles and as many close combat missiles (CCM).

New naval fighter in making

Even as preparations continue for the Tejas-Vikramaditya trials, the ADA and the DRDO have initiated work on designing the actual indigenous twin-engine aircraft that will fly from Indian aircraft carriers in future.

“The LCA Navy is a technology demonstrator. The naval version is very different from normal fighters because of the peculiar take-off and landing scenarios,” a Navy source said.

Unlike fighters meant for the Air Force, which has access to proper runways, naval aircraft only have limited space for take-offs and landings.

Also, unlike Air Force fighters, which come in to land with reduced power, naval aircraft arrive with full force before being stopped by arrestor wires, which are cables laid across the flight deck of a carrier.

The reason why naval fighters come in to land in take-off mode is because the aircraft would need enough power to quickly take off in case they miss the arrestor wires.

“The Navy has been clear from the very beginning that it needs a twin-engine aircraft and not single-engine because even if an engine fails, the aircraft should be able to land on the carrier,” the Navy source added.

The DRDO sources said a fresh design with a single higher-thrust engine, which meets the parameters laid down by the Navy, has been achieved.

“However, the Indian Navy has expressed that, with newly-emerging requirements, only a medium weight category twin-engine aircraft will be inducted for operations,” said another DRDO source.

“Currently, the configuration design of a twin-engine naval aircraft as sought by the user has been initiated. The initial flight-testing of this aircraft is scheduled to be carried out by 2026,” the source added.

The tests carried out so far on the shore and those planned for the aircraft carrier will provide inputs for the design and development of a twin-engine deck-based fighter (TEDBF) aircraft.

The naval Tejas is currently powered by a General Electric F404-GE-IN20 turbofan engine.

What is naval version of LCA?

Carrier-based fighters mainly come in three categories — STOVL (short take-off and vertical landing), STOBAR (short take-off but arrested recovery) and CATOBAR (catapult take-off but arrested recovery).

The LCA Navy is a STOBAR configuration aircraft that is being tested from a shore-based test facility (SBTF) at INS Hansa, Goa, to take off from a ski jump ramp with a short runway and also for arrested landings, as on-board a carrier.

The aircraft behaviour for a few seconds after ski jump take-offs, until wing-borne flight takes place, is critical to achieve a successful launch from carriers.

For the LCA, an automated ski jump take-off mode has been successfully implemented.

The indigenous fly-by-wire flight control system not only provides stability but also helps achieve an optimal take-off through the automatic ski jump take-off mode.

“About 50 ski jump take-offs have been carried out so far with various possible combinations that are likely to be done by this aircraft on-board a carrier,” a third DRDO source said.

Another challenging need of this aircraft is landing onboard carriers. Unlike in land-based aircraft, this is achieved through the arrested recovery of aircraft, which is done via arrestor cables, three of which are typically placed 12 metres apart on the deck.

On carriers, a precise landing of aircraft, each of which has an arrestor hook attached to pick up one of the cables, requires advanced flight control laws to aid the pilot.

This also demands high-strength landing gear and airframe.

“Several combinations of aircraft recovery with Arresting Gear System (AGS) at SBTTF have been successfully carried out by arresting the aircraft and bringing it to a halt within 90 metres,” one of the DRDO sources said. “To date, 28 arrested landings have been successfully achieved without ever missing the arresting wire.”

For the eventuality of a miss, a “bolter mode” has been developed. DRDO sources said the bolter mode was tested thoroughly before attempting the first arrested landing.

<https://theprint.in/defence/navys-tejas-aims-for-first-ever-take-off-from-aircraft-carrier-vikramaditya/329116/>

Firstpost.

Wed, 04 Dec 2019

'Akash missile system can't be trusted during war': Degraded by govt defence agencies, loopholes in strategic weapon system threaten national security

By Yatish Yadav

- *Other squadrons reported frequent unserviceability of mobile surface-to-air Akash Missile system and long duration downtime, which means that the missiles are dysfunctional and may not be cocked and loaded against enemy in contingency*
- *Several government agencies, including missile manufacturer Bharat Dynamics Limited, Bharat Electronics Limited, did not tell the truth to the government about malfunctioning Akash Missile system and poor quality of spare parts provided by the private vendors*
- *CAG was perhaps far-sighted, when in a 2017 report, the national auditor observed that Akash Missiles cannot be trusted in situation of a war*

On 3 June, 2018, Akash Missile's Transportation and Loading Vehicle (TLV), parked at an Air Force Squadron, was jolted after a sudden burst of tube followed by shearing off wheel bolts due to impact. The incident shocked Air Force headquarters. The Air Force officials wanted not only wanted the routine analysis of the incident, but also an in-depth discussion with Defence Research and Development Laboratory (DRDL), a multi-disciplinary Missile System laboratory under the Defence Research and Development Organisation (DRDO) to unearth issues hampering the functioning of the strategic weapon system.

More than a month later, another squadron reported cracks on air intake caps of dummy missiles. An investigation by *Firstpost* revealed that the incidents were followed by other squadrons reporting frequent unserviceability of mobile surface-to-air Akash Missile system and long duration downtime, which means that the missiles are dysfunctional and may not be cocked and loaded against enemy in contingency. This incident forced Guided Weapon Maintenance Department of Air Force on 5 September 2018 to raise the issue, where they clearly stated that the "Squadrons have been reporting frequent unserviceability



of Missiles and it has been noticed that time taken to resolve these failures is considerably high due to delay in analysis of failures."

The sheer inertia of government defence enterprise involved in Akash Missile production and maintenance reached to such an alarming level that at least three squadrons of Akash in February 2019 reported that missile system remained down or simply broken and sometimes even out of order during 90 percent of the time since their date of commissioning. These squadrons were commissioned between 2013-2015 to counter Chinese aggression.

Multiple government agencies, including Missile manufacturer Bharat Dynamics Limited (BDL) which comes under the Ministry of Defence, Bharat Electronics Limited (BEL) which is responsible for radars and maintenance and the DRDO, did not tell the truth to the government about malfunctioning Akash Missile system and poor quality of spare parts provided by the private vendors.

The malfunction of Integrated Air Compressor and Storage Facility (IACSF) revealed another shocker and the Air Force mentioned it on record that the IACSFs of Akash Missile System units are unserviceable due to wobbling and vibration, pneumatic leakage, breaking of mounting pads and bolts. A missile had failed to take off during combined guided weapon firing exercise known as 'CROSSBOW-18' and a team of Missile System Quality Assurance Agency (MSQAA), BDL and DRDL was constituted to investigate the failure.

MSQAA is an independent inspection Agency under the administrative and functional control of Director General Aeronautical Quality Assurance, which comes under the Department of Defence Production of Defence Ministry. The incidents of leakage from fuel tanks and leakage in pressurised Missile containers were taken so lightly that the Air Force, responsible to secure the nation from aerial threats, was forced to direct to the DRDL, BEL and BDL that present configuration of certain systems of Akash Missile will not be acceptable for future squadrons, which are under the process of procurement. The Air Force, BDL, BEL and DRDL are yet to respond to a questionnaire sent by *Firstpost* on 24 November.

Details expose criminal act by government defence enterprises

If there is an emergent situation, several Akash squadron may not be able to launch counter offensive because deficiencies in many of the system including hydraulic oil leakage and container pressure leakage, which is pending since 2017. The complaints received from Air Force headquarters, Eastern Air Command and other Akash field units reveals there is no back-to-back agreement with vendors for equipment under warranty, making it difficult to repair the faults. Documents reviewed by *Firstpost* showed that almost all squadrons have expressed that they are unable to get proper feedback from BEL on repairing the faults in Missile System and on problems plaguing Akash Missiles which Indian agencies are ill-equipped to resolve. Surprisingly the field engineers, who are supposed to rectify the critical snags, are not even aware of any action plan.

Documents further said: "Currently majority of the Akash field engineers are working to pass information about issues without any tangible technical output. The untrained and poorly equipped field engineers are neither aware of any corrective action plan nor they are committed."

The documents also pointed to massive delay in supply of spares for Missile System, virtually grounding them for for six months to a year. Air Force in a meeting had informed that most of the problems reported in 2017 were pending for over a year now. The documents also pointed at the repairing of Akash trailers which are covered under annual maintenance contract. It said: "Akash Trailers serviceability is poor and some cases spares supplied to Akash Missile units are not configured as per system requirement which is affecting equipment serviceability in case of failure."

Bharat Dynamics Limited (BDL) the manufacturer of Akash Missile has not been able to resolve three important issues for the last two to three years. BDL, founded in 1970, is a government enterprise under the administrative control of the Ministry of Defence. It is learnt that BDL was told in high level meeting convened last year to come out with solid plan after conducting an investigation

and study of faults in Akash Missile System within a month on long delays of critical faults. Even the investigation to unearth and address the issues was delayed.

The Air Force has refused to pay for new maintenance contract for certain Akash Missile squadrons as the old ones expired in September 2019. They argued that missile systems in several squadrons were left idle for more than a year. Instead, it had asked for extension of warranty for certain squadrons which have been dysfunctional for 17 to 15 months in the last two years. Air Force asserted since system was down and faults were neither rectified nor replaced, it violated the maintenance contract. Air Force is learnt to have said that "during the warranty period, the seller shall either replace or rectify the failed goods free of charge within 30 days of notification of such defects. As per article of the contract, warranty of the equipment would be extended by such duration from time the buyer has reported such unserviceabilities till the time seller has restored the status of the buyer's satisfaction."

Red tapeism in government defence enterprises hurt national security

Firstpost investigation also revealed gross inefficiency of government defence agencies BEL, BDL and DRDL to address the problem in Akash Missile System. Documents reveal that meetings after meetings were convened on the issues but the government defence enterprises couldn't satisfactorily answer the questions raised by Air Force. These government defence enterprises have been passing the buck. They also cheated Air Force by providing substandard and fake spares.

A meeting earlier this year chaired by Air Vice Marshal Bhanoji Rao pointed at severe negligence in handling Akash Missile System which may have serious ramifications in contingency. Documents revealed that certain spares, especially those of sub-vendors (procured by BEL) were being received at Akash Missile System units without 'Quality Assurance' certification and on a few instances it came to light that these spares were old and fake. In a letter, it was noted: "On few instances it has been noticed that the items were not new/authentic."

Air Vice Marshal Rao clearly told his team at the Air Force not to accept spares without 'Quality Assurance' certification. The meeting also revealed a lack of expertise of government-owned defence enterprises which are acting merely as a supplier of equipment after procuring it from domestic and foreign vendors. It basically means that these government enterprises are acting like a payment facilitators. Their complicity in this entire saga was further exposed when government defence enterprises officials told the senior Air Force officials that sub-vendors (private companies supplying spares) were not willing to share their design documents.

An appalled Air Vice Marshal asked, if the Defence Research and Development Laboratory (DRDL) is the authority then it must have intellectual property rights of all designs related to Akash Missile System. Obviously, the defence agencies representatives were not aware about it since they never took the pain to look into the agreements and promised the Air Force to look into the matter to ascertain whether these rights were with vendors. A promise was made to list all major vendors for unhindered supply of spares to overcome single vendor situation. As far as BEL is concerned documents said: "Almost all squadrons have expressed that they are unable to get proper feedbacks from BEL on progress and plan of action of pending faults."

The meeting chaired by Air Vice Marshal Rao also discussed high failure rate of one of the systems of Akash Missile, lacunae in analysis of faults and mismatch in software versions used for the this strategic weapon.

Another major loophole, which highlights the non-seriousness of defence agencies, is the contract with the private vendors. The agreements are more favorable to private parties putting Akash Missile System in jeopardy. Documents flagged these concerns further pointing out that all the vendor supplied items are outside their warranty obligations and in certain cases supplied spares are not configured as per system requirements. Some spares for Akash Missiles are not fit and functional and this is affecting the equipment serviceability in case of failure.

It appears that careless handling of most critical weapons has been going on for a long time. The Comptroller and Auditor General of India (CAG) was perhaps far-sighted when in a 2017 report, the national auditor observed that Akash Missiles cannot be trusted in situation of a war. CAG had categorically stated that Akash missile system delivered by BEL were deficient in quality and 30% missiles failed the test.

"Audit found that the Strategic missile system delivered by BEL were deficient in quality. Out of 80 missiles received up to November 2014, 20 missiles were test fired during April-November 2014. Six of these missiles i.e., 30 percent, failed the test. Preliminary failure analysis report revealed that the missiles fell short of the target, had lower than the required velocity, and also there was malfunctioning of critical units like Servo Control Unit and Connector. Two missiles had failed to take off because the booster nozzle had failed. These deficiencies posed an operational risk during hostilities. Two missiles had failed to take off because the booster nozzle had failed. These deficiencies posed an operational risk during hostilities." CAG report had said.

Firstpost investigation showed that after the CAG report, the squabbling between government defence enterprises had come to light. Eight critical snags in Akash Missile Systems were reported after the CAG report which were pending for three-seven months. CAG had recommended that Ministry of Defence needs to ensure better synchronisation of the various activities and agencies involved in such strategically important projects to ensure their timely completion and quality of Strategic Missiles also needs improvement so as to bring down failure rate.

Notwithstanding, many snags were not rectified citing lack of spares. The Air Force anguished over lackadaisical attitude of BEL and BDL has firmly directed them to resolve all internal issues immediately and ensure that no Missile is kept unserviceable due to their internal problems.

<https://www.firstpost.com/india/akash-missile-system-cant-be-trusted-during-war-degraded-by-govt-defence-agencies-loopholes-in-strategic-weapon-system-threaten-national-security-7728651.html>

THE TIMES OF INDIA

Wed, 04 Dec 2019

Navy Chief Admiral Karambir Singh flags concern over decline in funds allocation to Navy

New Delhi: In the backdrop of China's aggressive naval expansion, Navy Chief Admiral Karambir Singh on Tuesday pitched for higher budgetary allocation for his force, flagging concerns over decline in the Navy's share in defence allocation from 18 per cent in 2012-13 to 13 per cent in 2019-20.

In a reference to Indian Navy driving out a Chinese PLA ship from India's Exclusive Economic Zone in September, the Navy Chief asserted that such activities will be dealt with sternly.

The Navy's long-term capability plan is to have three aircraft carriers so that two carrier battle groups are ready for deployment in the Indian Ocean Region round-the-clock.

In a press conference on the eve of the Navy Day, the Navy Chief said the first indigenous aircraft carrier (IAC) will be fully operational by 2022 and it will have a fleet of MiG-29K aircraft.

According to plans, he said the second IAC will be 65,000 ton CATOBAR aircraft carrier with electric propulsion and that Navy will shortly approach the government seeking approval for the project. At present, the Navy is operating Russian-origin INS Vikramaditya which is India's only aircraft carrier.

On China's increasing forays into the Indian Ocean region, Admiral Singh said seven to eight Chinese ships are usually present in region at any point of time.

Asked why China has not been invited to the Milan maritime exercises along with 41 other countries, he said only like-minded nations will be part of it.

Admiral Singh also assured the nation that the Navy is fully prepared to deal with national security challenges.

On the proposed Chief of Defence Staff (CDS), he said the position should be adequately empowered to implement strategic plans.

Referring to the Navy's modernisation plan, Admiral Singh said it was a fact that the budget for the force has declined from 18 per cent in 2012-13 to 13 per cent in 2019-20. "Our hope is that we get some more funds."

It is learnt that the Navy has already communicated to the Prime Minister's Office the need for adequate funds for modernisation of the force.

On the challenges in the neighbourhood, he said no action of any other player in the region should impact India, and if it does then, the force will deal with it appropriately.

Asked about the situation in the Indo-Pacific region, the Navy Chief said Indian Navy was ready to work with like-minded nations based on common interests of ensuring safe and secure seas and promote rules-based order.

He also said that the quadrilateral coalition of India, the US, Japan and Australia does not have a military role in the Indo-Pacific region at the moment.

The Navy Chief also said India is playing a stabilising role in the Indo-Pacific region.

To a query on the massive expansion of the Chinese Navy, he said they are moving at the pace they are capable of and "we are moving at the pace we are capable of" .

On whether the Navy has any plan to conduct an exercise with China, Admiral Singh suggested that he was not the person to take such a decision. "It is beyond my pay grade, " he quipped.

<https://timesofindia.indiatimes.com/india/navy-chief-admiral-karambir-singh-flags-concern-over-decline-in-funds-allocation-to-navy/articleshow/72350436.cms>

The Indian **EXPRESS**

Wed, 04 Dec 2019

Navy Chief Karambir Singh: Preparing case to convince govt on 3 aircraft carriers

There is only one aircraft carrier — INS Vikramaditya that was commissioned in 2013 — at the moment while a second Indigenous Aircraft Carrier (IAC-1) is under construction, which, according to Admiral Singh, will be ready by 2022

By Krishn Kaushik

New Delhi: Navy Chief Admiral Karambir Singh Tuesday said the Navy was preparing its case to convince the government to have three aircraft carriers so that two carrier battle groups can be deployed in the Indian Ocean Region at any given time even as the share of the Indian Navy has reduced in the defence budget.

There is only one aircraft carrier — INS Vikramaditya that was commissioned in 2013 — at the moment while a second Indigenous Aircraft Carrier (IAC-1) is under construction, which, according to Admiral Singh, will be ready by 2022.

“As Naval Chief I am convinced that the country requires three aircraft carriers so that two of them are operational at any given time. We are just preparing our case, we are finalising our requirements to

go up to the government for the Acceptance of Necessity (AoN). Once the AoN is given then we will get into the consultancy of the exact contours of the carrier,” he said.

The Navy chief earlier pointed out that the Navy’s share of the defence budget “has declined from 18 per cent in 2012 to approx 13 per cent” in the current financial year. “While, we have projected our requirement to the government, we remain committed to progress force modernisation, using the available resources optimally,” he said, adding that “in the face of shortages, emphasis is on prioritisation, rationalisation and economy of expenditure”.

Expressing hope of getting more funds, the Navy Chief said that “our budget has declined, but we projected this and our hope is we will get some money and will prioritise our requirement”.

The Navy Chief pointed to “another milestone” of the “induction of women pilots in MR stream, which is the mainstream maritime surveillance wing of the Naval Air Arm”. He said that three women officers have been selected to undergo pilot training and Sub Lt Shivangi successfully completed her Stage II training at Kochi on Monday, “making her the first woman pilot of Indian Navy”.

The other two officers, he said, will be graduating this month.

<https://indianexpress.com/article/india/navy-chief-karambir-singh-preparing-case-to-convince-govt-on-3-aircraft-carriers-6149297/>



Wed, 04 Dec 2019

India watching China's presence in Indian Ocean: Navy Chief

New Delhi: India is keenly watching China's increasing presence in the Indian Ocean region, Indian Navy Chief Admiral Karambir Singh said on Tuesday, assuring that India is capable of thwarting any threat.

Addressing a press conference here ahead of the Navy Day celebrations on December 4, Singh said: "China has increased presence in the Indian Ocean since 2008. We are keenly watching them."

"There are Chinese oceanographic research vessels in the exclusive economic zone. On an average seven to eight vessels are present near this zone. They are here sometimes to carry out mining, sometime as anti-piracy squad," said Singh, adding that the Indian Navy carries out whatever prompt action is needed.

Admiral Karambir Singh also stressed that the India Navy is fully aware about Pakistan's intention in the Indian Ocean region.

"We also know about the intelligence input about that terror groups planning to enter India through sea routes. We have put an adequate defence mechanism to thwart any threats," Singh said.

<https://www.dailypioneer.com/2019/top-stories/india-watching-china-s-presence-in-indian-ocean--navy-chief.html>

Repelled Chinese vessel in Sept, says Navy Chief

According to marinetraffic.com, a ship tracking and maritime intelligence website, the Shi Yan 1 is 60 metres long, 26 metres wide and has a gross weight of 3,071 tonnes. The website tracked the Chinese-flagged vessel's current position to the South China Sea

By Rahul Singh

New Delhi: Navy chief Admiral Karambir Singh on Tuesday said that a Chinese vessel that had intruded into Indian waters near the Andaman and Nicobar Islands, where it was supposed to not be, in September, was repelled.

The Chinese research vessel, Shi Yan 1, was spotted near Port Blair and was suspected to be carrying out an ocean survey in India's exclusive economic zone (EEZ). Every coastal country's EEZ extends to 200 nautical miles (370 km) from its shores and the country in question has exclusive rights to all resources in the water, including oil, natural gas and fish.

"Our stand is that if you have to do anything in our EEZ, you have to notify us and take permission," the navy chief said during his customary press conference ahead of Navy Day on December 4.

According to marinetraffic.com, a ship tracking and maritime intelligence website, the Shi Yan 1 is 60 metres long, 26 metres wide and has a gross weight of 3,071 tonnes. The website tracked the Chinese-flagged vessel's current position to the South China Sea.

Singh said the navy was closely monitoring China's growing footprint in the Indian Ocean region, attributing it to the neighbour's economy and aspirations. Anti-piracy patrols and freedom of navigation are the chief reasons cited by China for its rising presence in the region.

Amid growing sightings of Chinese naval assets in the Indian Ocean region, the navy in 2017 recalibrated its deployment to position mission-ready warships and aircraft along critical sea lanes of communications and choke points.

India will host the next edition of the multination naval drills, called Milan, off the Vizag coast in March 2020. India's biggest maritime exercise is likely to involve 41 countries but the Chinese navy has not been invited.

Admiral Singh said India had invited only "like-minded" countries to take part in the naval drills. "We haven't even done a passage exercise with the Chinese navy. With the other countries, we have better interoperability," the navy chief explained. The exercise was traditionally staged off Port Blair but has been moved to the eastern seaboard as "it offers better bandwidth," for bigger drills, he said.

Singh flagged concerns about a steady decline in the navy's share of the defence budget over the last eight years and how it could hit the service's plans to deploy a fleet of 200 warships by 2027. The navy may reach a figure of 175 warships over the next seven years, navy vice chief Vice Admiral G Ashok Kumar said.

The navy's share of the budget has slipped from 18% in 2012-13 to 13.66% in 2019-20. Singh said the navy had projected the requirement of additional money to the government.

Hindustan Times reported on September 18 that the capital expenditure of Rs 23,156 crore earmarked for the navy in the defence budget for 2019-20 is not sufficient to meet its requirements and the service plans to demand at least Rs 20,000 crore more to support its modernisation efforts.

"We hope we can get some money... we are prioritising our requirements so that India's maritime interests are not compromised," Singh said. He said instead of sheer numbers, the navy was working on making its platforms more lethal and increasing their capabilities for maximum effect.

Responding to a question on the fund crunch the navy is facing and the swift modernisation of the Chinese navy, the navy chief said, “China is moving at a pace it is capable of and we are moving at a pace we are capable of...Our aim is to get maximum bang for the buck.”

He said the Indian Navy needed to have a fleet of three aircraft carriers to secure the country’s maritime interests. “As the navy chief, I am convinced that we need three carriers so that two are operational at all times.” He said the navy would induct its first indigenous aircraft carrier by 2022 and the broad contours for developing the second indigenous carrier had been finalised.

As the government prepares to appoint a chief of defence staff (CDS), Singh said the CDS should be “suitably empowered” to take decisions and carry out the responsibilities assigned to him. On August 15, Prime Minister Narendra Modi announced the creation of a CDS for more effective coordination between the three services.

<https://www.hindustantimes.com/india-news/repelled-chinese-vessel-in-sept-says-navy-chief/story-StPnpJOYWOlqAcwrDZfvjJ.html>

हिंद महासागर में चीनी पोतों से बढ़ी जासूसी : नौसेना अफसर

जागरण संवाददाता, कोलकाता : बंगाल एरिया के नौसेना के ऑफिसर इंचार्ज कमोडोर सुप्रभो ने मंगलवार को नौसेना दिवस की पूर्व संध्या पर कहा कि बीते कुछ वर्षों से चीन के नौसैनिक पोतों द्वारा हिंद महासागर में जासूसी की घटनाएं बढ़ी हैं। भारतीय नौसेना इस तरह की गतिविधियों पर पैनी नजर रख रही है।

संवाददाता सम्मेलन में उन्होंने कहा कि हिंद महासागर में कुछ प्रमुख क्षेत्र हैं, जिससे नौसेना को वहां की गतिविधियों को नजर रखने में मदद मिलती है। इसमें बंगाल की खाड़ी भी शामिल है। उन्होंने कहा कि अत्याधुनिक पी-81 समुद्री गश्ती विमान से हम हिंद महासागर में किसी प्रकार की गतिविधियों पर नजर रख सकते हैं। भारत के पास वर्तमान में लंबी रेंज के पी- 81 समुद्री गश्ती विमान हैं और नौसेना ने इस विमान के निर्माता बोइंग से इस प्रकार के चार

चीन की गतिविधियों पर भारतीय नौसेना की पैनी नजर, सुप्रभो ने कहा- 2021 तक भारत के पास होंगे 198 पोत

और विमान के लिए ऑर्डर दिया है।

नौसेना अधिकारी ने कहा कि भारतीय नौसैनिक बेड़े में इजाफा ऐसे समय में किया जा रहा है, जब चीन की पीपुल्स लिबरेशन आर्मी नेवी (पीएलएएन) हिंद महासागर में अपनी गतिविधियां बढ़ा रही है। उन्होंने बताया कि 2021 तक भारत के पास 198 पोत होंगे जिनमें से 131 पोत अलग-अलग प्रकार के होंगे। नौसेना समुद्र व तटीय इलाकों में तस्करी तथा देश-विरोधी गतिविधियों की निगरानी के लिए बीएसएफ, तटरक्षक बल और राज्य पुलिस के साथ समन्वय करती है। नौसेना हर चुनौती से निपटने को हमेशा तैयार है।

महिला अफसरों को समंदर में भी ड्यूटी देने की तैयारी

नेवी को जो भी नया ट्रेनिंग शिप मिलेगा उसमें 15% सीट होंगी महिलाओं के लिए

Poonam.Pandey@timesgroup.com

■ नई दिल्ली : इंडियन नेवी में महिला अधिकारियों को समंदर में ड्यूटी देने की दिशा में एक अहम कदम उठाया गया है। अब नेवी को जितने भी नए ट्रेनिंग शिप मिलेंगे, उनमें 15 फीसदी सीटें महिला अधिकारियों के लिए रिजर्व होंगी। नेवी के एक सीनियर अधिकारी ने कहा कि इसकी जरूरत को सरकार ने भी मान लिया है। इसकी मंजूरी भी दे दी है। इसके लिए ट्रेनिंग शिप में उसी तरह के इंतजाम किए जाएंगे।

नेवी में महिलाएं पहले से ही कॉम्बेट यानी लड़ाई के मोर्चे पर हैं। समंदर के बाहर ड्यूटी वाले विभाग में महिलाओं के लिए परमानेंट कमिशन खुला है। लेकिन अभी महिलाओं की ड्यूटी समंदर में नहीं लगती। नेवी के अधिकारी के मुताबिक वॉरशिप में महिलाओं की तैनाती से पहले उन्हें ट्रेनिंग देनी होगी और अब ट्रेनिंग शिप में उनके लिए सीटें रिजर्व करना इस दिशा में एक बड़ा कदम है।

अभी नेवी में महिलाएं एसएससी के जरिए लॉ कैडर, ऑब्जर्वर, पायलट (एमआर), इंस्पेक्टर (एनएआई), लॉजिस्टिक्स, एटीसी, एजुकेशन और नेवल कंस्ट्रक्टर्स में आ सकती हैं। परमानेंट कमिशन के जरिए महिलाएं एजुकेशन, लॉ और नेवल कंस्ट्रक्टर्स कैडर में हैं। करीब छह साल पहले नेवी ने महिलाओं को कॉम्बेट रोल (लड़ाकू भूमिका) में भी शामिल किया। वह पी-8-आई, और आईएल-38 में ऑब्जर्वर हैं। कॉम्बेट रोल में करीब 68 महिला अधिकारी हैं। नेवी में अभी करीब 650 महिला अधिकारी हैं। अब महिला अधिकारियों की सी गोइंग रोल में जाने की राह भी धीरे धीरे खुल रही है।



नेवी चीफ ने कम होते बजट पर जताई चिंता

■ इंडियन नेवी चीफ ने कम होते बजट पर चिंता जाहिर की साथ ही उम्मीद जताई कि इस बार उन्हें जरूरत के मुताबिक बजट मिलेगा। नेवी चीफ एडमिरल कर्मबीर सिंह ने कहा कि पिछले कुछ सालों में डिफेंस बजट में नेवी का हिस्सा लगातार कम हुआ है। 2012 में यह 18% था जो 2018 में कम होकर सिर्फ 13% रह गया। उन्होंने कहा कि हम बजट के हिसाब से अपनी प्राथमिकताएं तय कर रहे हैं। नेवी चीफ ने उम्मीद जताई कि बजट की कमी दूर की जाएगी। नेवी चीफ ने कहा कि नेवी को आधुनिक साजो-सामान से लैस कराने के लिए ज्यादा बजट की जरूरत है। उन्होंने कहा कि नेवी को तीन एयरक्राफ्ट कैरियर की जरूरत है ताकि हर वक्त दो एयरक्राफ्ट कैरियर ऑपरेशन के लिए उपलब्ध रहें। अभी नेवी के पास एक ही एयरक्राफ्ट कैरियर है।



नेवी चीफ कर्मबीर सिंह नई दिल्ली में मंगलवार को एक प्रेस कॉन्फ्रेंस के दौरान

Sailing ahead to glory

As Indian Navy celebrates its 48th Navy Day today, here's a look at the stellar legacy of one of the mightiest navies in the world

Bijin.Jose@timesgroup.com

One of the strongest naval forces in the world, the Indian Navy is celebrating its Navy Day. At present, owing to its technological advancements, defence capabilities, modern weaponry, the Indian Navy is considered to be among the top navies in the world. The Indian Navy has been playing a vital role in maintaining peace at India's maritime front. Not just maritime security, humanitarian assistance and disaster relief operations, the Indian Navy is tipped to play a significant role in the coming years, especially safeguarding India's interests in the Indian Ocean Region (IOR).

STRATEGIC ROLE

"Given the geo-strategic realities in the Indian Ocean Region and its intricate association with the littorals for the sustainable progress of the nation and the prosperity of its people, the Indian Navy plays a pivotal role. Whilst war-fighting is a given role for any navy, maintaining peace and stability is equally important. Hence, the core force structures of the future navy must balance between the applications of the will of the nation, and the utilisation of its assets for the common good. Hence, while warships, submarines, aircraft must continue to be inducted, amphibious aircraft, hospital ships, satellite imagery and integrated surveillance and response systems are equally vital for a new navy," said Commodore Sujeet Samaddar (retd), former senior consultant with NITI Aayog.

Almost 90 per cent of the trade is through sea route and thus a safe environment is vital. India's interest in the IOR is increasing and so is the role of Indian Navy. Not only for its energy security, but for its trade, security of fisheries against poaching and antipiracy needs.

"Maritime affairs cannot be managed only by the Indian Navy or by the Ministry of Defence, it needs a 'whole of government' and 'whole of nation' approach. The time has come to ensure effective integration and coordination of national resources and harmonise them with international treaties. A national maritime policy and a national maritime council is needed," added Commodore Sujeet Samaddar (retd).

CRUCIAL ROLE

The Indian Navy supports foreign policy objectives to 'build bridges of friendship' and strengthen international cooperation

A SAGA OF VICTORY

Indian Navy day is observed on December 4 to celebrate the magnificence, achievements, and the role of the Indian Navy in national security. The day is also observed to commemorate the attack by the Indian Naval Missile boats on the Karachi harbour on December 4, 1971, during the India-Pakistan war.

According to the Navy chief, the Indian Navy, at present, executes maritime cooperation broadly through four methods—constructive engagements such as high-level visits, joint exercises; collaborative efforts such as CORPAT (coordinated patrols); capacity building; and capability enhancement.

The Indian Navy now has an astounding stature. However, it had a modest beginning. It was a small force with merely 33 ships in 1947. Owing to the forbidding nature of the challenges in maritime security, the Indian Navy has constantly evolved, inducted more ships, modernised its weapons, and continuously relied on technology and innovation to flourish.

AN EVER-EVOLVING FORCE

Ahead of the Navy Day celebrations, the Indian Navy welcomed its first woman pilot, sub-lieutenant Shivangi, on-board on December 2. The 24-year-old Sub Lieutenant will be flying the Dornier surveillance aircraft of the Indian Navy. The Dornier aircraft are used by the navy for transport and maritime reconnaissance. This is a major milestone in the history of the Indian Navy, as until 1992, the navy only inducted women to serve in the medical services.

According to the Ministry of Defence, the Indian Navy has positions for 735 pilots with about 644 posts currently filled. The Indian Navy has over 200 aircraft including MIG 29-K fighter jets, Boeing P-8I, maritime surveillance aircraft, and other various reconnaissance aircraft and helicopters. Recently, a top naval officer said that the Indian Navy is aiming to have a 200-ship fleet by 2027 in order to guard interests and assets of the nation.

"The Indian Navy is doing a marvellous job. Now, we maintain presence in long distance for longer duration. Despite the increase load on men and material, the navy has been performing fine. At the same time, its modernisation and action plan are as speedy as they should be. However, more funding is required because production of ships and submarines takes time," said Vice Admiral BS Randhawa (retd).

Depending on the type of vessel, the production can take a year or can extend up to five years. "In order to maintain the strength, there needs to be a balance in production of new ships and the number of ships and equipment that are being laid off. The ship-building programme of the Chinese Navy is going much faster than ours; it is time we must maintain the momentum in our strategic planning and execution," concluded Vice Admiral Randhawa.

MDL delivers 2nd Scorpene submarine

Successful execution of complex project is a testament to shipyard's capabilities



MAZAGON Dock Shipbuilders Limited (MDL), called 'Ship Builder to the Nation', is one of India's leading Defence public sector undertaking shipyards under the Ministry of Defence and it continues to serve the nation under the "Make in India" programme. It delivered the second Scorpene submarine 'KHANDERI' to the Indian Navy at an event held in Mumbai recently. The Acceptance Document was signed by Cmde Rakesh Anand, Chairman & Managing Director, MDL and RAdm B Sivakumar, Chief of Staff Officer (Tech), Western Naval Command in the presence of MDL Directors and Navy personnel at MDL. The submarine would soon be commissioned into the Indian

Navy. This is a milestone event for MDL.

The submarine 'KHANDERI' is named after the wide-snouted Saw fish, a deadly sea predator of the great Indian Ocean. The first Submarine Khanderi was commissioned into the Indian Navy on 06th December, 1968 and decommissioned on 18th October, 1989, after more than 20 years of yeoman service to the nation. In true nautical tradition, she will now be 'reincarnated' by MDL to guard the vast maritime area of our nation.

Building the Scorpene was indeed a challenge for MDL, as the complexity of the simplest of tasks increased exponentially due to all work having to be done in the most congested of spaces. This com-

plexity was further aggravated by the stringent tolerances required to be achieved. However, all of these challenges were accepted head-on and successfully overcome by MDL, without any compromise on quality whatsoever.

The technology utilised in the Scorpene has ensured the submarine having superior features. The Scorpene class of submarines can undertake multifarious tasks typically undertaken by any modern submarine, which include anti-surface as well as anti-submarine warfare.

With the delivery of Khanderi, India further cements its position as a submarine building nation and MDL has lived up to its reputation as one of the India's leading shipyards with a capacity to meet the requirements of the Indian Navy, as acknowledged by the "Indian commercial and warship building and ship repairing industry report" released by CRISIL in Mumbai in March, 2018.

The construction of the third Scorpene at MDL, KARANJ, was started on 31st January, 2018, and it is currently undergoing the rigorous phase of sea trials. The fourth Scorpene, VELA was recently launched in May 2019, and is being prepared for sea trials, whilst the remaining two submarines, VAGIR and VAGSHEER, are in various stages of outfitting. The Scorpene project would not have made the progress it has without the unconditional support and active encouragement of the Department of Defence Production (MoD).

It is also pertinent to mention that the two SSK submarines built by MDL in 1992 and 1994 are still serving the Indian Navy, after more than 25 years. This is testimony to the capabilities of MDL.

MBDA: Excellence on the Indian Navy's side

JV with L&T has a host of quality products lined up

LOÏC PIEDEVACHE

AS THE Indian Navy patrols the seas, it knows it has excellence on its side with high-performing missile systems from MBDA such as Exocet on board its new Kalveri-class submarines. MBDA is proud of its long history supporting the Indian Navy, and to be celebrating Navy Day with the naval service.

MBDA has been supporting India's armed forces for over 50 years, providing over 40,000 missiles built in India during this time, and is working through its Indian joint venture – L&T MBDA Missile Systems Ltd – on Make in India programmes and providing new enhancements for the Indian Navy's fighting potency. L&T MBDA Missile Systems Ltd is offering Exocet MM40 Block 3 for the Indian Navy's Medium Range Anti-Ship Missile (MRAShM) requirement, the latest version of the venerable Exocet missile already in service with the Indian Armed Forces, which has improved electronics and an extended range.

For the Indian Navy's Short-Range Surface to Air Missile (SRSAM) requirement, L&T MBDA Missile Systems Ltd is proposing its next-generation Sea Ceptor system. Sea Ceptor utilises the CAMM missile that features a next-generation all-weather RF-seeker, two-way datalink and soft-vertical launch system to provide a step-change in performance compared with previous

generation systems able to protect Indian vessels from attacks from fast sea-skimming missiles attacking from multiple directions simultaneously. Sea Ceptor is the most high-performance and modern air defence system in the market and also provides easy platform integration and many space, weight and safety benefits compared with older systems.

MBDA also has a full spectrum of missile systems to meet all the arming requirements of naval helicopters. For long-range requirements, MBDA's famous and combat proven Exocet AM 39 missile is available; Marte ER provides excellent extended medium range capability, while Sea Venom/ANL provides unrivalled fire-and-forget or operator above the loop ability to engage multiple targets at short to medium ranges in open waters or even challenging littoral environments.

For the Indian Navy's special forces, L&T MBDA Missile Systems Ltd is offering ATGM5, the world's only true 5th Generation Anti-Tank Missile as an Indian Designed Developed and Manufactured (IDDM) product under the Make in India programme. ATGM5 offers many unique capabilities, including being truly network enabled, a multipurpose warhead with selectable effects, and high-performance seeker technologies. It is proven for use in the maritime environment from small special forces vessels.

The author is Country Head India, MBDA

LCA (Navy) reaches a path-breaking milestone

Complete cycle of launch and recovery accomplished in a single sortie

SEMINAL achievement was recently accomplished in the quest for technologies related to operation of indigenous fighter aircraft from aircraft carriers. On 29 September, 2019, LCA Naval Prototype-2 launched off the ski jump at 1621 hours and then subsequently "trapped" at 1631 hrs on the arresting gear site (both locations situated at Shore Based Test Facility INS Hansa, Goa). While both these feats had been achieved individually earlier, this was the first occasion when the complete cycle of launch and recovery necessary for

aircraft carrier operations was accomplished in a single sortie.

Being a pioneering technology acquisition and demonstration programme for the unique Short Take-Off but Arrested Recovery (STOBAR) concept of aircraft operations, the LCA (Navy) team has had to conceptualise and experiment with complex software modes from a clean slate. All this had to be done while tentatively exploring and incrementally expanding the structural capa-

bilities of the aircraft to withstand the stringent requirements of carrier operations. The exploratory nature of this stage of the programme necessitates experimentation with multiple software options and hardware configurations. These include multiple configurations of

aerodynamic surfaces, different flight control strategies, avionics tools and display symbols to ease the piloting task, multiple iterations to the "mechanicals" (dampers/structural members/contact points), etc.

Comprehensive and seamless integration of all these experimental variants simultaneously into a single platform is therefore not possible till all options have been eval-

uated and the preferred configuration has been decided. The events on September 29, 2019, therefore, demonstrate the completion of the basic exploration phase of the programme and transition to refinement and improvement iterations.

Raksha Mantri Rajnath Singh has congratulated DRDO, ADA, HAL and the Indian Navy for this major feat. Secretary, Department of Defence, R&D and Chairman DRDO Dr. G Satheesh Reddy also congratulated DRDO, ADA, HAL and the Indian Navy for the achievement.



Indian Navy has made huge strides in the last decade



CMDE SRIKANT B KESNUR

THE Navy's growth and development is a subset of developments in the world at large and in the country at the same time. In a decade of changing political, economic and technological landscape globally, and, in India, it is worth seeing how the Navy fared in this period. Arguably, having attained the status of a blue water navy, how did it take this further? It is evident that there has been significant addition of assets in all dimensions – the powerful aircraft carrier Vikramaditya, new generation guided missile Kolkata Class destroyers, state-of-the-art Kalvari class submarines, formidable P8I and MiG 29K aircraft and other smaller specialised platforms.

But going beyond number crunching there were important areas that merit attention. The first of these relate to the massive strides towards becoming a networked force. Maritime Domain Awareness (MDA) improved manifold and Cooperative Engagement Capability (CEC) has been proven. Indigenous Communication satellites, greater weapon sensor fusion, inauguration of the International Fusion Centre (IFC) at Gurugram for collation of white shipping, creation of networking hubs and platforms that could see, hear and detect far better than hitherto have

contributed to this outcome.

The second issue relates to coastal and maritime security which became even more important post 26/11. Organisational initiatives to involve all stakeholders at the national level, creation of Joint Operations Centre (JOC) to bring all maritime actors on a common grid, raising of the Sagar Prahari Bal (SPB), a dedicated coastal security force, and acquisition of special craft for this purpose were some of the key developments in this decade.

Third, the Navy gave added impetus to academic endeavours with several doctrine and strategy related initiatives, be it publication of India's Maritime Security Strategy (IMSS) 2015 and the revised Indian Maritime Doctrine or organisational changes to encourage scholarship. In parallel, technology led growth in communications, weapons systems, information security, cyber capabilities and deep sea rescue added to knowledge generation and dissemination.

Fourth, all of the above were dovetailed into Navy's other roles. Mission-based and extended deployments, both in terms of time and distance from home port, became the new norm and these were skillfully woven into the diplomatic and constabulary matrix as well. Maritime diplomacy and Humanitarian Assistance and Disaster Relief (HADR) got a

huge fillip because of the organic capabilities that were built. There were thus several achievements in both 'Diplomatic' and 'Benign' domains such as International Fleet Review (IFR) 2016, Goa Maritime Conclave (GMC), Indian Ocean Naval Symposium (IONS), and several HADR or Non Combatant Evacuation (NEO) situations where the Indian Navy was the first or principal responder. The forthcoming multinational exercise MILAN, in March 20, in Visakhapatnam, will further boost this facet of the service.

Strategically, in this decade, India was seen as a rising power. The Indian Navy was considered one of the key instruments in making our presence felt and showcasing our intent. Consequently, the Indian Navy gathered more traction and mindspace in global and regional strategic forums. We can, thus, conclude that 2010-2019 was a decade of further growth and transformation of the Navy into a technologically advanced, networked force capable of exhibiting all aspects of sea power. The Navy would continue to need adequate budgetary support to be a credible force and safeguard our national maritime interests, which are likely to further increase in keeping with our aspirations of having a \$5 trillion economy by 2024 and due to naval developments in the Indo-Pacific.

Indian and Chinese troops to conduct joint military exercise in Umroi

The drill will see participation of 130 soldiers from both sides, with the Chinese contingent coming from the Tibet Military command. The exercise is planned at the company level with respective battalion headquarters controlling the training

By Bikash Singh

Guwahati: Indian and Chinese troops will conduct a 14-day-long joint military exercise at Umroi, Meghalaya, beginning December 7 with focus on counter terrorism. 'Hand-inHand 2019' will be the 8th such drill between the two nations.

The drill will see participation of 130 soldiers from both sides, with the Chinese contingent coming from the Tibet Military command. The exercise is planned at the company level with respective battalion headquarters controlling the training.

“The aim of the exercise is to practice joint planning and conduct of counter terrorist operation in semi-urban terrain,” the army said. “The exercise schedule is focused upon training on various lectures and drills associated with counter terrorist handling and firing with each other’s weapons, battle obstacles course, special heliborne operations and case studies of various operations carried out in counter terrorist environment.”

Two tactical exercises are scheduled during the training —counter terrorism scenario and humanitarian and disaster relief (HADR) operations.

<https://economictimes.indiatimes.com/news/defence/indian-and-chinese-troops-to-conduct-joint-military-exercise-in-umroi/articleshow/72341874.cms>

TN techie helped Nasa find Vikram on moon

*Chennai techie Shanmuga Subramanian helped Nasa to identify
the crash site of the Vikram lander of Chandrayaan-2*

By Yamuna R

Chennai: Chennai techie Shanmuga Subramanian helped Nasa to identify the crash site of the Vikram lander of Chandrayaan-2 on the lunar surface just when the space science community was getting desperate over not being able to decipher the disappearance of the lander on September 7 when it was supposed to do a soft touchdown on the moon.

The 33-year-old engineer posted on Twitter that Nasa has credited him with finding the Vikram debris on the lunar surface as his conclusions from Nasa images helped the US space agency to spot the exact location of the lander that reportedly broke into several pieces on crashlanding.

The IT professional went through Nasa's Lunar Reconnaissance Orbiter Camera (LROC) images "pixel by pixel" to identify a single bright pixel from its mosaic taken on November 11, and emailed his conclusion to both Nasa and Isro. While the US space agency responded, though a bit late, and apologised for the delay, there was silence from Isro.

"I had gone through the LROC images pixel by pixel and found some minute variations at a spot on the lunar surface between the image of December 2017 and the one taken on September 7, when Vikram was supposed to land. I sent my findings to Nasa and what they did was to closely search the lunar surface based on the location I gave and pick up the location of the larger debris", Mr Subramanian told this newspaper, amid a stream of media interviews at his Besant Nagar apartment.

From the two LROC images, Mr Subramanian could point out to Nasa that the 2017 image had no white dot whereas the September 2019 image had it at that spot, that could only mean it was the Vikram lander, which could only be visible as a dot because it was 1.25m per pixel. "I saw the Internet landing location. From the Vikram lander's last known location, I knew it must be somewhere around that. I searched the 2x2 km sq area pixel by pixel — one pixel is around 1.25m or something like that. Since the lander was so small, I had to search each and every pixel. I was able to find something out of ordinary over there and I sent out a mail to Nasa", the proud "space scientist" added.

While the nation plunged into sadness after the much-anticipated moon mission failed, Isro explained that contact with the Vikram lander could have been lost due to "hard-braking" in the final phase of its descent. The American space agency, which had been closely following the mission, as well as several international agencies, collaborated in the Isro search for clues on the lander's whereabouts. Nothing much happened, until Mr Subramanian's email landed at the two space agencies. "I feel happy I could find the debris. I had worked for close to seven hours every day for a week, going through the LROC images from Nasa. It was worth it", Mr Subramanian added.

<https://www.asianage.com/india/all-india/041219/tn-techie-helped-nasa-find-vikram-on-moon.html>