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We are focusing on ‘Buy Global, Make in India’ Policy; will strive to complete all processes within two years-- Defence Secretary, Ajay Kumar

Defence Secretary Ajay Kumar has been driving policies and reforms in aerospace and defence to transform what is potentially marked as the most promising areas for industrial growth. In an exclusive interaction with Manish Kumar Jha of BW Businessworld, the Defence Secretary outlines his key policy direction, that is, ‘Make in India’ in Defence. He talks about the major acquisition plans and strategic partnerships on crucial projects – 75I submarine, AK 203-joint production line, light tank and the critical aero-engine technology. He also clarifies the key policy aspects on offset and FDI in defence and is forthcoming about the need to create a more level-playing field, testing labs, certification processes and systems for other players.

By Manish Kumar Jha

Defence Secretary Ajay Kumar has been driving policies and reforms in aerospace and defence to transform what is potentially marked as the most promising areas for industrial growth. As technology is at the center stage for building next generation capabilities for the Indian armed forces, the policy thrust on R&D is the only mantra. In an exclusive interaction with Manish Kumar Jha of BW Businessworld, the Defence Secretary outlines his key policy direction, that is, ‘Make in India’ in the field of defence. He talks about the major acquisition plans and strategic partnerships on crucial projects – 75I submarine, AK 203-joint production line, light tank and the critical aero-engine technology. He also clarifies the key policy aspects on offset and FDI in defence and is forthcoming about the need to create a more level-playing field, testing labs, certification processes and systems for other players.



Defence Secretary: Photo Credit : Manish Jha/BW

Manish K Jha: Recently, the Indo-US Industrial Security Joint Working Group has been formed. MOD already has a working mechanism—DTTI—which is led by you. What is the role of the Joint Working Group and how will it collaborate on critical defence technologies?

Ajay Kumar: DTTI is a mechanism which is led by the Defence Secretary — Production from India and the Undersecretary from US Acquisition Department. There are several sub groups which are working in different areas. Each sub group is coordinated by respective services. Also, several projects are in the advanced stage. Although there was not much progress on DTTI, of late, there has been improvement. We have now been able to sign at least one major contract under the DTTI.

Today under the major defence partnership with US, both sides are looking to identify other areas of cooperation under DTTI. And we hope to see that more technologies will flourish. A great

deal of development is taking place on swarm technology. There is in fact a sub group on aero engine which is engaged in such talks on critical technologies. This is under DTTI again which is led by DRDO from our side and a counterpart from their side (US).

Manish K Jha: This is about the key technology and acquiring advanced capabilities. The Indian armed forces is looking for 500 aircraft in the near future. Aero engine is the costliest part of any fighter aircraft so again here we save huge cost while having such advanced capabilities. Do you see it as a national mission as you have been leading many discussions on such advanced capabilities?

Ajay Kumar: The discussion is led by DRDO with several vendors including Rolls Royce, Safran and GE among others. At the same time effort is being taken to develop the same capabilities by our lead R&D agencies.

It is incorrect to say that we don't have any technology in this area. Helicopters' engines are being made at HAL already. On 70 KN Engine Technology or thereabout, DRDO has been able to develop.

It is now the ability -- what is called the hot process, technology and the materials that are required in the making of aero engine, which is what they are working on.

So the indigenous effort is going on and at the same time, to speed up the process, discussions are going on with other vendors.

Manish K Jha: You were instrumental in issuing RFI for P 75I which is under the first strategic partnership program and it is conditioned on Fuel-Cell based AIP plant. When do you expect the final stage to commence? Is there any bottleneck?

Ajay Kumar: There is no bottleneck. We have had good response on P75I from the OEMs and the strategic partners as well. RFP has been floated. We will evaluate the bids and finalize everything very soon

AIP is the important part of technology and all OEMs have to provide the AIP technology.

Manish K Jha: Could you throw light on AK- 203 assault rifles which is jointly owned by the Indian Ordnance Factory Board and the Russian firm, ROE? What is the nature of the technological transfer? Could you also tell us about the expected production timeline?

Ajay Kumar: As you are aware, the final negotiations of the contract are going on and very shortly the work should start.

Manish K Jha: The Finance Minister has announced the monetization plan to unlock the government assets for optimal usage. Do you see such scheme being implemented in the defence sector as it could generate good capital and lead to better utilization of assets?

Ajay Kumar: Defence is different. We don't have any such announcement. Please don't confuse it with other sectors. Ordnance factories are all about corporatization and bringing in professionalism. We have defence land and infrastructure for public which is based on the policies of the government. In terms of cooperation and collaboration with the industry, we have lots of such requests and we honour them. But there has been no decision to monetize defence land.

Manish K Jha: There have been structural changes in Ordnance Factory Board (OFB) as it has been converted into seven defence public sector units (DPSUs). It is indeed a landmark decision, but what about funding for incorporating next generation technological upgrades, smart assembly lines for production and efficiency?

Ajay Kumar: We have already given about Rs 6500 crores. Seven companies came into existence on October 1, 2021. As corporate entities, they are also supposed to raise money from institutional finances. They will work as a company now. Funds have been released. Corporate management structures have been created. So government is supporting the OFB in their initial phase to make way.

Manish K Jha: There are concerns on the offset policy. Industries share the note which is released by Deference Offset Management Wing (DOMW) that “a wholly owned Indian subsidiary of an Indian vendor is not eligible as an Indian Offset Partner (IOP) to discharge offset obligations for the same foreign vendor”. There is an ambiguity about it. It hinders their program as they cannot discharge through their own subsidiaries. There should be flexibility on that. Could you share your thoughts on this?

Ajay Kumar: Our focus is increasingly on ‘Atmanirbhar Bharat’. As you are aware, this year, two third of our budget is going for such initiatives under Atmanirbhar Bharat. Some of it goes into buying spares, on maintenance and MRO for the foreign platforms which we have. Offset is only attractive if the procurement is above Rs 2000 crores. Given our focus on Atmanirbhar Bharat, offset will not be the big part of procurement.

We are focusing on ‘Buy Global, Make in India’. With our new FDI policy, foreign companies can come and ‘Make in India’ and supply to the forces. So, there is no need for the offset in that case.

In old cases which have been there, the contract has been signed as per the policy of that time (DPP or DAP). Any change in policies will not be feasible, keeping the sanctity of the contract.

Therefore, companies who signed those contracts need to align with the contractual obligations for that period. But anyway, in future, offset requirement will continue to decline progressively.

Manish K Jha: The Indian Army has issued the RFI for the Light Weight Mountain Tank under 25 ton. Could you give us update as this is marked as a key project under Make in India? Besides, it is to be noted that China has developed and deployed the Type-15 light tank (ZTE-15) along the border in the Tibet-Qingdao Plateau and the Gobi Desert.

Ajay Kumar: There is a fast track process and there is an emergency procurement process. So all that is there. If there is a need to go for fast track the forces can go through these processes.

In any case, we are striving to complete all normal processes within two years.

So it is not that long a period. So this is the concerted effort and all services are working hard to achieve this as well. The average procurement time used to be 5-6 years, which we have now reduced drastically. We are trying to reduce it to two years in the near future.

Manish K Jha: Could give us some clarity on FDI in aerospace & defence?

Ajay Kumar: Defence is not like IT. In defence, government is a major buyer. So people will invest linked to government procurement decision and I am sure it comes in different forms. If you look at C-295 (Airbus military aircraft) where majority of aircraft will be manufactured in India, they have found partners in India. So investment is also coming from Indian partners.

So in the defence sector, FDI can come from different forms.

Nevertheless, you see how Safran has invested in India in the components of aero engine. Boeing is setting up a huge facility in India, investing in the research, design and development. Lots of OEMs have created supply chain partners in India. There are over 100 of them in India.

Manish K Jha: What is your plan for iDEX in terms of funding and grant for the Indian defence startups? Does it fund directly to the startups or through the evaluation by other agencies?

Ajay Kumar: I think we did not give focus adequately on R&D.

Under the Raksha Gyan mission, we started the drive that all OFBs and DPSUs should create their own IPs. In the first year itself (2018-19), there were about 750 IPs which were created by these entities. This is the first time that DPSUs are filing IPs.

Then, we started the system where we asked them to create new technologies where you can partner with industry and startups. All of them had tie-ups with academia, startups and industries so that they could create products of their own—even without getting orders from the services. So all of these measures have started. Some of them are working on artificial intelligence, explosives etc. So the real value is in the technology. Production is also very important but that focus on technology is well understood.

The second part is, why only be limited to DRDO, DPSUs and OFB? We have the whole gamut of our industry, startups ecosystem and our academia. So why not use their knowledge and expertise? Industry is working on so many new technologies without any funding from government and we can create more products.

The only assurance that we give is — if you make the products, we will buy them. Under iDEX, many startups have created technologies. So the larger point I am making is that technology is the key.

Also, we have to strengthen all the hands we have, including DRDO, DPSUs, industry and academia. Many countries are looking towards India for defence production.

There are more things to be done — we need to create a more level-playing field, testing labs, certification processes for other players.

We need to make all such systems available to other players. We will see significant change in aerospace and defence in India. DRDO has come out with the Development cum Partners - Production policy and iDEX is the policy in this direction. DRDO has a list of 100 items that industry will develop on their behalf. This is significant progress. And, it will take another two to five years for advanced capabilities to be available in India.

<http://www.businessworld.in/article/We-Are-Focusing-On-Buy-Global-Make-in-India-Policy-Will-Strive-To-Complete-All-Processes-Within-Two-Years-Defence-Secretary-Ajay-Kumar/06-11-2021-411111/>



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Modernisation of Indian Armed Forces through Indigenisation

By Richa Tokas

A strong and well-equipped military provides a country the immunity to resist attack and thwart unprovoked aggression from external sources and deal with any kind of internal disturbance. It works as a defence mechanism and reflects the country's military capability and capacity to defend itself against the hostile countries. Equipping the military with the latest technology and modernising the existing inventory of weapons and surveillance systems is therefore crucial for any country. India too needs to build a strong military force armed with all types of technologically advanced defence equipment to strengthen its security and intelligence and to secure its territorial integrity.¹



Source : DoD, Ministry of Defence, India

All over the world, the countries which are embroiled in any kind of internal security issues or have border disputes with hostile neighbours or face any kind of terror threat or countries which

face any war-like situation are spending more and more on strengthening their defence portfolio. The countries feel that only a strong defence and security framework can overcome any kind of threat to their autonomy or sovereignty. The technological advancement has led to development of very sophisticated weapons and many countries are now in possession of such weapons. These include ballistic missile systems, nuclear powered submarines, stealth fighter airplanes, Unmanned Aerial Vehicles, etc. For tackling any kind of untoward happening, any country requires a robust and a modernised defence and security framework. Therefore, along with procuring new defence products, emphasis should be laid on doing it in such a manner that the weapons system does not become obsolete in a few years. Further, such products should be capable of being upgraded without much hassle. Any country cannot sideline the modernisation aspect as it holds the key to managing any form of unexpected aggression: internal or external.

In the current geopolitical situation, it has become vital for India to maintain its regional autonomy. India needs to assert its presence and sovereignty over the border regions and for that, it needs to have modernised defence products and strategic autonomy over such defence products. This strategic autonomy can be achieved by having a self-reliant defence industry which would ultimately strengthen the Indian economy as well. It is the need of the hour to increase the indigenous defence production to meet the requirements of the armed forces along with putting lesser burden on the exchequer. India requires an overhaul of its defence products to meet the current requisites of modern warfare. To create a robust security framework India needs to strengthen its surveillance system which requires inducting of modernised radars and drones so that suspicious activities and trespassing at the border areas could be detected at the earliest. India also needs to understand that it cannot always depend on the emergency purchases of defence equipment during the times of crises, which has been seen during the recent border clashes with Chinese troops and the rising tension along the northern borders. This has forced accelerated domestic and foreign purchase of weapons,² however relying on the imports for emergency purchases leads to excessive spending.

Aiming to make India a manufacturing hub is a step taken in the right direction under the ambit of 'Aatmanirbhar Bharat Abhiyan'. Promoting investments in research and development and production in the defence sector will prove to be significant in enhancing the manufacturing of defence products and in creating employment opportunities. Aatmanirbhar Bharat in the defence sector will reduce dependency on imports which will lead to a reduction in the foreign exchange expenditure and enhance the level of operational preparedness considerably. Domestic manufacturing will promote the growth of many ancillary industries within the country and at the same time, it will generate a lot of revenue by exporting defence products to other countries. Restructuring of approximately 200-year-old Ordnance Factory Board into seven State-owned corporate entities in line with the vision of Aatmanirbhar Bharat would not only increase competitiveness, but will also improve quality, cost-efficiency while ensuring self-reliance in the defence sector.³ This will help in reducing the trade deficit as well. Defence Acquisition Procedure, DAP-2020 has aimed to bring into line and support the Aatmanirbhar Bharat Abhiyan by focusing on self-reliance by boosting domestic manufacturing and encouraging private sector involvement.⁴

After the clarion call of Prime Minister Narendra Modi for 'Aatmanirbharta' and indigenisation of products in all spheres, specific efforts have been made to indigenise the Indian defence industry, and to reduce the huge import bill of the defence products. The induction of Light Combat Aircraft Tejas is a huge accomplishment in this regard, and another order for 83 Tejas fighter jets will certainly help in strengthening the Indian Air Force as well as boosting the morale of the Indian defence industry.⁵ Further, the embargo upon the import of 209 defence equipment means that they would be indigenously developed in India.⁶ A separate fund has been earmarked for supporting the start-ups (iDEX) and MSMEs for the development of design and new technology in the defence and aerospace sector.⁷ The government has permitted Foreign Direct Investment of up to 74 per cent in defence production through the Automatic Route to encourage domestic manufacturing and use of innovative technology in defence products, keeping into consideration the active participation of private sector. Through Automatic Route any foreign

investor or Indian company can directly invest into the defence sector without any prior approval of RBI or Government of India. This would encourage ease of doing business and encourage investments in the Indian defence industry. Moreover, states are showing interest in establishing and developing defence industries in their region, for instance, Karnataka has requested the Government of India to set up a Defence Technology Hub as it already has various Defence Public Sector Undertakings like HAL, BEL and laboratories of DRDO.⁸ If the Indian Government keeps up with this pace of modernising Indian Armed Forces through ‘Indigenisation’, it will certainly bring a big boost to the Indian economy. Consistent efforts of the stakeholders involved in policymaking and effective implementation of the self-indigenisation campaign will be crucial for realising this dream. With the right kind of support and assistance from the Government of India, the local industries will be able to fulfil the domestic demands of the Indian armed forces and strengthen them to confront the adversaries effectively. The Indian armed forces need to be battle-ready even on short notice, especially in view of the changing nature of the threat within military domains.

Views expressed are of the author and do not necessarily reflect the views of the Manohar Parrikar IDSA or of the Government of India.

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Significant hearing loss due to prolonged stay in high altitude, finds Army study

Pilot study shows deterioration of hearing thresholds in tested frequencies in both ears after a long stay (one year) in high altitude area

By Vijay Mohan

Chandigarh: Even as the unprecedented concentration of troops along the Himalayan border with China continues, a new study by military medical experts has highlighted the adverse impact on the hearing ability of soldiers who are deployed in high altitude areas over a prolonged period.

After observing significant variation in the threshold levels of hearing before and after induction in high altitude areas, the study has recommended greater focus on this area which has so far remained on the sidelines of research on the effects that high altitude has on the human body.

The hearing thresholds of 433 soldiers posted in high altitude areas were recorded using pure tone audiometry with different frequencies at the time of induction and then again after a year's stay in high altitude.

Statistical comparison of the two sets of thresholds for air conduction revealed worsening of hearing in both ears, though there was some variation in the mean quantum of deterioration between right and left ears. "These results are found to be statistically significant for all frequencies," the study observed.

Titled, "A pilot study comparing hearing thresholds of soldiers at induction and after completion of one year in high altitude area," the research undertaken by four military officers and an executive director in the Ministry of Health and Family Welfare, has been published in the latest issue of Medical Journal Armed Forces India.

"The pilot study shows deterioration of hearing thresholds in tested frequencies in both ears after a long stay (one year) in high altitude area," the authors said. "We recommend further structured research on otologic effect of long term stay in high altitude," they added.

The authors pointed out that despite so much research in high altitude area, our existing knowledge is still lacking on otological effects of long-term stay in high altitude. Otolaryngology is the branch of medicine dealing with the anatomy and physiology of the ear and its disorders and treatment. This also assumes significance in light of another study jointly undertaken by western experts that was published in the International Archives of Occupational and Environmental Health in May 2021. The western study, while observing that temporary threshold shift for noise induced hearing loss is significantly more pronounced at high altitudes, said that acclimatisation does not provide any protection of the inner ear, although it increases arterial oxygen saturation.

High altitude is known to have adverse physiological as well as psychological impact on the human body due to extremely low temperature, lack of oxygen, dietary requirements, restricted movement and general isolation. All troops undergo a structured acclimatisation programme on induction into high altitude areas.

The Armed Forces Medical Services as well as the Defence Research and Development Organisation have undertaken voluminous research on high altitude deployment of men and equipment so as to mitigate the environmental impact on the human body and better sustain operations in the high snow-bound mountains.

<https://www.tribuneindia.com/news/health/significant-hearing-loss-due-to-prolonged-stay-in-high-altitude-finds-army-study-335181>



Photo for representation. — iStock

NEP will turn India into global knowledge superpower: Governor Biswabhusan Harichandan

Harichandan participated in the Fifth Convocation of the Krishna University as Chancellor, in virtual mode from Raj Bhavan on Saturday

Vijayawada: Governor Biswabhusan Harichandan has said that the present generation of students are fortunate that the 34-year-old education system in the country has undergone a major reform with the introduction of the National Educational Policy 2020, from elementary-level education to higher education.

Harichandan participated in the Fifth Convocation of the Krishna University as Chancellor, in virtual mode from Raj Bhavan on Saturday. Addressing the students, Harichandan said the NEP 2020 was built on the concept of access, equity, quality, affordability and accountability, with an aim to transform India into a vibrant knowledge society and a global knowledge superpower with holistic, inclusive, flexible and multi-disciplinary form of education suited for the 21st century needs.

The NEP 2020 aims at increasing the Gross Enrolment Ratio (GER) from 26.3% to 50% by 2035, the Governor said. The Governor said he was happy to learn that the Krishna University has started functioning from its own campus, spread over 103 acres with two administrative and academic blocks located at Rudravaram near Machilipatnam, from January, 2019.. He congratulated the students who received their medals for the excellent performance and all students who received their degrees.

Dr G Sateesh Reddy, Secretary of the Department of Defence Research & Development and Chairman of the DRDO, the chief guest-cum-orator of the Convocation, said that the Indian students should equip themselves to compete at the global level. Prof N Balakrishnan, scientist, Indian Institute of Science, Bengaluru, has been conferred with Degree of Honoris Causa, during the convocation. Prof KB Chandra Sekhar, V-C, presented the medals to students.

<https://www.newindianexpress.com/states/andhra-pradesh/2021/nov/07/nep-will-turn-india-into-global-knowledge-superpower-governor-biswabhusan-harichandan-2380538.html>



Andhra Pradesh Governor Biswabhusan Harichandan (File Photo |EPS)

Evolution of Anti-Drone technology

By Dr. Parshotam S Manhas

The term “drone” sometimes referred to as “Unmanned Aerial Vehicles” (UAVs) can carry out umpteenth tasks, ranging from military operations to package delivery. Drones have become almost ubiquitous as they are being extensively used across sectors for quick imagery and can reach places where humans cannot reach.

The widespread evolution of drones have made them more affordable and accessible but it cannot be ruled out that some nations have deployed them for otherwise malicious reasons like dropping IEDs, smuggling arms, ammunition, and drugs across borders. Drones can be a threat if not in the right hands and not used with due caution. In recent times, there have been many instances



where drones have breached security and intruded into other territories. Such intrusion of drones underlines the exigent need for the armed forces to build capabilities to deter, detect and neutralize such aerial threats in the future and led to the development of anti-drone technology. Anti-drone systems are used to track and intercept unwanted drones and unmanned aerial vehicles (UAVs). Nowadays, there are a plethora of signal jammers, radio spoofers, drone interceptors, and compressed air guns that are designed to knock drones off the sky.

DRDO has developed anti-drone technology to disable or shoot down hostile drones. Its anti-drone system has a range of two to three kilometres with radar capability to pick up the drone and then use frequencies to jam the unmanned aerial vehicle.

Anti-drone technology is a sensitive subject that has long been mired in controversy among the drone pilot community, law enforcement, and the general public. Recent incidents involving the malicious use of drones have emphasized that anti-drone technology need to be a part of the arsenal of local law enforcers and other regulatory bodies.

The technology depends on a variety of techniques for detecting or intercepting drones. Most drones are spotted using techniques like Radio Frequency (RF) detection, Electro-Optical and Infrared and are then destroyed with techniques like RF Jamming, GNSS Jamming, Spoofing, Laser, nets, projectile, or Combined Interdiction Elements.

Today, there are many players in the market who are providing techniques to counter drones and some of the top counter-drone technologies are listed below.

Sky Fence: It is a fully programmable and automated electronic countermeasures system developed by UK firms Drone Defence and Eclipse Digital Solutions that can jam the signal that a drone uses to communicate with its pilot and prevents drones from flying into or close to a protected site by disrupting its command and navigation radio transmissions.

Drone Gun: It is a portable anti-drone technology developed by Australian firm DroneShield to jam and cut off signals between the drone pilots and its remote controller. It is a rifle-shaped device that uses radiofrequency jamming and GPS jamming to counter drones. This can either initiate the drone’s return-to-home function or force it to land gently to the ground. Keeping the drone intact is the goal of the DroneGun, as it aids in investigation and in locating the responsible drone pilot. The DroneGun is compact and can be operated by a single person. It can take down rogue drones up to a range of 1 km in a wide range of environmental conditions.

DroneCatcher is a net gun-armed multi-copter designed by Delft Dynamics. The system safely eliminates illegal drones from the air. The DroneCatcher shoots a net at the rogue drones in restricted airspace areas over places like airports and military installations to knock them out

easily. It is highly effective against Multi-Rotor type drone which once tangled in the net drop-off of the sky easily.

SkyWall 100 developed by a team of UK-based engineers shoots out a net that can wrap around a suspicious drone and its propellers, eventually bringing it down. A ‘skywall 100’ is the ground version of the ‘drone catcher’ and it works by bringing down a UAV using a parachute that is hurled through a net from 100 meters distance and keeps the drone intact for further investigation. SkyDroner detects, distract and disable drone from flying into a restricted zone. The system consists of multiple sensors to monitor the activity of a drone within a 1km range, identifies types of drones, and provides real-time tracking of flight paths by pinpointing the location of drones and their operators. After detection, the system can distract a drone by taking over the command and control frequencies and then disables communication links to the drones. During an emergency, it is capable of immobilizing the drone to prevent it from further intrusion.

ATHENA (short for Advanced Test High Energy Asset), developed by defense giant Lockheed Martin, is a high-energy laser system that can completely destroy the rogue drone in the air. The ATHENA is transportable and enables the Air Force to position it anywhere they need to defend bases and high-value assets. According to the developer of ATHENA, the technology can be handy in the near future for protecting soldiers against drone swarm attacks, even a large number of rockets and mortars.

<https://www.dailyexcelsior.com/evolution-of-anti-drone-technology/>

COVID 19: DRDO's Contribution

ET Healthworld.com

Mon, 08 Nov 2021

The need to develop ventilator standards in India

The role of ventilators has been amplified several-fold during the ongoing Covid-19 pandemic when the widespread projections of a shortage of the life-saving device in the country, also on account of the curtailed supplies from abroad. In a matter of months, the production of ventilators had shot up considerably

By Ashok Patel

Quality of care is directly proportional to the quality of the tools and instruments used in dispensing care in tandem with the skill sets and the expertise of the caregiver and the training and the experience of the attendants – who are using those tools and instruments. This is particularly relevant for a device such as a mechanical ventilator which has been responsible for saving the lives of millions across the world. The role of ventilators has been amplified several-fold during the ongoing Covid-19 pandemic when the widespread projections of a shortage of the life-saving device in the country, also on account of the curtailed supplies from abroad, were addressed through a rapid and massive scaling up of domestic production. From traditional ventilator manufacturers to PSUs to automobile companies to research organisations to start-ups and last but not the least, the government – the country as a whole has ‘stood up’ to meet the impending challenge. In a matter of months, the production of ventilators had shot up considerably. By July itself, the production had been augmented from 300 per month by 8 manufacturers to over 30,000 ventilators per month by 16 manufacturers



However, this phenomenal increase in quantity also needs to be complemented with improvement in quality of these lifesaving machines. And quality can only be ensured by way of prescription of a comprehensive set of standards for these critical machines.

The regulation of medical devices

In India, medical devices are regulated under the Drugs and Cosmetics Act of 1940 and Medical Device Rules 2017. Only in February this year, the government tightened the regulatory regime for medical devices by redefining them, expanding the list to include all medical devices and subjecting them to the rules under Drugs and Cosmetics Act of 1940 and Medical Device Rules 2017. This was a huge development from the earlier regulation of only 37 categories of medical devices.

Ventilators classified as Class C risk

Under the classification of medical devices under Schedule M-III of Drugs and Cosmetics Rules 1940, medical devices are divided into four classes according to their risk level and ventilators fall under Class C that covers moderate-to high-risk devices (bone fixation plates are also under the same class), one grade lower than the high-risk devices such as heart valves and implantable defibrillators.

Steps taken so far: Six technical features recommended by the Technical Committee of the DRDO

In the course of the early discussions on identifying standards for the ventilators to be produced domestically, the Technical Committee of the DRDO had laid down certain essential technical features as it had convened periodically in the wake of the Covid-19 battle. These features were as follows: One, the machine should be turbine/compressor based because the installation sites might not have central Oxygen Lines. Two, the machine should have Invasive, non-invasive and CPAP features to make them versatile. Three, the machine should be able to provide 200-600 ML tidal volume while having Lung Mechanics Display. Four, the machine should be able to monitor the Plateau Pressure, oxygen concentration, inverse ratio (I:E) while allowing Positive-end Expiratory Pressure Therapy (PEEP) and Pressure Support (PS). Five, the machine should be available in pressure, volume and pressure support modes. And six, the machine should have the working capability for 4 to 5 days continuously without power back-up.

Need to develop standards for the entire spectrum of diseases and not Covid alone

However, these technical guidelines are merely minimal essential specifications and have been confined to the context of the government's procurement overdrive to rule out any shortage of ventilators in the country for Covid patients. In fact, until Covid-19 struck, ventilators were not regulated medical devices in the country, neither under the Bureau of Indian Standards (BIS) certification nor under the Central Drugs Standard Control Organisation (CDSCO) regulation. Significantly, in the third week of June, the Bureau of Indian Standards notified the Indian standard IS 17426: 2020 for ICU ventilators for use in Covid-19- Specification by publishing in the Gazette of India. This is not enough for two reasons. First, given the involvement of a wide range of players involved in the manufacturing of a final ventilator product and accessories through the value chain, a comprehensive set of specifications and standards must be thrashed out. Additionally, mindful of the fact that the ventilators are also used for a whole lot of other lung-related complications, specific standards in relation to a particular lung condition as well as broad standards have to be evolved keeping the long term in view. And second, now that there has been a large-scale involvement of domestic manufacturers in making ventilators, it makes the case for an indigenous set of standards and specifications. Earlier, since the bulk of ventilators used in the country were imported, the FDA or CE standards used to be applicable. As of now, according to Medical Device Rules 2020, ventilator manufacturers should adhere to quality management standards of ISO 13485. Also, they should comply with general requirements for basic safety and essential performance of medical electrical equipment under IEC60601-1-12, and particular requirements for basic safety and essential performance of critical care ventilators under IEC60601-2-12, both global standards.

Related equipment such as catheters have been regulated before

Notably, similar medical devices have been regulated before. Under the Medical Devices Rules 2017, the government had listed out names, risk class and general uses for some catheters – a related device to ventilators – the quality and safety aspects of which are equally important for patients, although classified as B class, a notch below the more risky ventilators. Some of these catheter devices were as follows. Tracheal tube: that is used to obtain a closed circuit for ventilation; Esophageal Obturator: that aids ventilation by blocking esophagus thereby permitting positive pressure ventilation through the trachea; Tracheobronchia Suction Catheter: that clears the airways of mucus, pus, or aspirated materials to improve oxygenation and ventilation.

It is understandable that the government has allowed the manufacturing of critical lifesaving devices without licensing and with minimal specifications in response to the exigent nature of the times. Only weeks ago, the government announced that it had delivered 36,433 ventilators to government hospitals in the country in less than a year with average cost ranging between ₹ 2-10 lakh. This must be applauded. However, this increase in quantity must be followed up with regulations and standards for quality. Remember, there was uproar on domestic ventilators not being BiPAP-enabled forcing the government to clarify on the same. A comprehensive blueprint on ventilator standards would obviate the need for such doubts and clarifications while establishing more clarity. Also, given the criticality and the inherently risky nature of these devices, non-negotiable quality must go hand-in-hand with quantity. After all, it's a question of patients' safety and lives.

By Ashok Patel, Founder & CEO, Max Ventilator

(Disclaimer: The views expressed are solely of the author and ETHealthworld.com does not necessarily subscribe to it. ETHealthworld.com shall not be responsible for any damage caused to any person/organisation directly or indirectly.)

<https://health.economictimes.indiatimes.com/news/medical-devices/the-need-to-develop-ventilator-standards-in-india/87566006>



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Fri, 05 Nov 2021 2:44PM

Curtain Raiser: Goa Maritime Conclave – 2021

IN's Outreach Initiative for 'Harnessing Maritime Thought'

The 3rd edition of Goa Maritime Conclave (GMC) – 2021 is being held from 07 to 09 November 2021 under the aegis of Naval War College, Goa. The GMC is Indian Navy's Outreach Initiative providing a multinational platform to harness the collective wisdom of practitioners of maritime security and the academia towards garnering outcome oriented maritime thought. GMC-21 would build upon the working level deliberations of the Goa Maritime Symposium-21 held earlier in May this year, as the *Sherpa* event for the Conclave.

The theme for this year's edition of GMC is "Maritime Security and Emerging Non-Traditional Threats: A Case for Proactive Role for IOR Navies", which has been derived keeping in mind that necessity of 'winning everyday peace' in the maritime domain. At the GMC-21, Adm Karambir Singh, Chief of the Naval Staff of Indian Navy would be hosting Chiefs of Navies/ Heads of Maritime Forces from 12 Indian Ocean littorals, including Bangladesh, Comoros, Indonesia, Madagascar, Malaysia, Maldives, Mauritius, Myanmar, Seychelles, Singapore, Sri Lanka and Thailand. The Defence Secretary and Foreign Secretary would be delivering the Conclave Address and Keynote Address of the GMC-21.

With IOR becoming the focus of the 21st century strategic landscape, the GMC aims to bring together regional stakeholders and deliberate on the collaborative implementation strategies in dealing with contemporary maritime security challenges. The Conclave participants would benefit from interactions with eminent speakers and subject matter experts over three sessions focusing on - *Leveraging Collective Maritime Competencies to Counter Emerging Non-Traditional Threats, Strengthening Regional Cooperation for Maritime Law Enforcement and Imperatives for Mitigating Emerging Non Traditional Threats in areas beyond National Jurisdiction in the IOR.* There would also be extensive deliberations in the domains of Hydrography and Maritime Information Sharing. The participating Chiefs of Navies/ Heads of Maritime Agencies would also dwell upon the significance of interoperability to effectively deal with emerging and future maritime security challenges in the Indian Ocean Region.



As part of the Conclave, visitors would also be afforded an opportunity to witness India's indigenous shipbuilding industry at the 'Make in India Exhibition' and the capabilities of Deep Submergence Rescue Vessel (DSRV) for Submarines at the Marmugao Port Trust, Goa.

In its third iteration, the Goa Maritime Conclave continues to strive to advance the principle of *Collective Responsibility* for ensuring safe and secure seas and sustained peace in the Indian Ocean Region.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1769505>



पत्र सूचना कार्यालय
भारत सरकार
रक्षा मंत्रालय

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पूर्वावलोकन: गोवा सामुद्रिक संगोष्ठी- 2021

'सामुद्रिक ज्ञान के इस्तेमाल' के लिए भारतीय नौसेना की आउटरीच पहल

गोवा मैरीटाइम कॉन्क्लेव (जीएमसी) - 2021 का तीसरा संस्करण 07 से 09 नवंबर 2021 तक नेवल वॉर कॉलेज, गोवा के तत्वावधान में आयोजित किया जा रहा है। जीएमसी भारतीय नौसेना की आउटरीच पहल है जो समुद्री सुरक्षा के अभ्यासियों और शिक्षाविदों के सामूहिक ज्ञान का उपयोग करने के लिए एक बहुराष्ट्रीय मंच प्रदान करती है ताकि परिणामोन्मुख सामुद्रिक समझ प्राप्त की जा सके। जीएमसी-21 कॉन्क्लेव शेरपा कार्यक्रम के रूप में इस साल मई में आयोजित गोवा समुद्री संगोष्ठी-21 के कार्य स्तर के विचार-विमर्श पर आधारित होगा।



जीएमसी के इस वर्ष के संस्करण का विषय "मेरीटाइम सिक्वोरिटी एंड इमर्जिंग नॉन ट्रेडिशनल थ्रेट्स: ए केस फॉर प्रोएक्टिव रोल फॉर आईओआर नेवीज़" है जिसे समुद्री क्षेत्र में 'हर रोज़ शांति' की आवश्यकता को ध्यान में रखते हुए बनाया गया है। जीएमसी-21 में भारतीय नौसेना के नौसेनाध्यक्ष, एडमिरल करमबीर सिंह, बांग्लादेश, कोमोरोस, इंडोनेशिया, मेडागास्कर, मलेशिया, मालदीव, मॉरीशस, म्यांमार, सेशेल्स, सिंगापुर, श्रीलंका और थाईलैंड समेत हिंद महासागर के 12 समुद्री देशों से नौसेना प्रमुखों/ समुद्री बलों के प्रमुखों की मेजबानी करेंगे। रक्षा सचिव और विदेश सचिव जीएमसी-21 के कॉन्क्लेव के उद्घोषण व मुख्य भाषण देंगे।



हिंद महासागर क्षेत्र के 21वीं सदी के रणनीतिक परिदृश्य का फोकस बनने के साथ ही जीएमसी का लक्ष्य क्षेत्रीय हितधारकों को एक साथ लाना और समकालीन समुद्री सुरक्षा चुनौतियों से निपटने में सहयोगी कार्यान्वयन रणनीतियों पर विचार-विमर्श करना है। कॉन्क्लेव के प्रतिभागियों को प्रख्यात वक्ताओं और विषय वस्तु विशेषज्ञों के साथ तीन सत्रों में - उभरते गैर-पारंपरिक खतरों का मुकाबला करने के लिए सामूहिक समुद्री दक्षताओं का लाभ उठाना, समुद्री कानून प्रवर्तन के लिए क्षेत्रीय सहयोग को मजबूत करना और बाहर के क्षेत्रों में उभरते गैर पारंपरिक खतरों को कम करने के लिए अनिवार्यताएं, आईओआर में राष्ट्रीय क्षेत्राधिकार जैसे विषयों पर बातचीत से लाभ होगा।

हाइड्रोग्राफी और समुद्री सूचना साझा करने के क्षेत्र में भी व्यापक विचार-विमर्श होगा। भाग लेने वाले नौसेना प्रमुख/ समुद्री एजेंसियों के प्रमुख हिंद महासागर क्षेत्र में उभरती और भविष्य की समुद्री सुरक्षा चुनौतियों से प्रभावी ढंग से निपटने के लिए अंतःक्रियाशीलता के महत्व पर भी ध्यान देंगे।

कॉन्क्लेव के अंतर्गत आगंतुकों को 'मेक इन इंडिया प्रदर्शनी' में भारत के स्वदेशी जहाज निर्माण उद्योग और मारमुगाओ पोर्ट ट्रस्ट, गोवा में पनडुब्बियों के लिए डीप सबमर्जेस रेस्क्यू वेसल (डीएसआरवी) की क्षमताओं को देखने का अवसर भी दिया जाएगा।

अपनी तीसरे संस्करण में गोवा सामुद्रिक संगोष्ठी हिंद महासागर क्षेत्र में सुरक्षित समुद्र और निरंतर शांति सुनिश्चित करने के लिए सामूहिक जिम्मेदारी के सिद्धांत को आगे बढ़ाने का प्रयास जारी रखता है।

<https://pib.gov.in/PressReleasePage.aspx?PRID=1769668>



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Ministry of Defence

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Vice Admiral Krishna Swaminathan assumed charge as Chief of Staff, Western Naval Command

Vice Admiral Krishna Swaminathan assumed charge as Chief of Staff of the Western Naval Command on 04 Nov 21.

Commissioned into the Indian Navy on 01 Jul 1987, Admiral Swaminathan is a specialist in Communication and Electronic Warfare and an alumnus of the National Defence Academy, Khadakvasla; the Joint Services Command and Staff College, Shrivenham, United Kingdom; the College of Naval Warfare, Karanja; and the United States Naval War College, Newport, Rhode Island, USA.

A recipient of the Ati Vishisht Seva Medal and Vishisht Seva Medal, he has held several key operational, staff and training appointments in his naval career including the command of missile vessels INS Vidyut and Vinash; the missile corvette, INS Kulish; the guided missile destroyer, INS Mysore and the aircraft carrier, INS Vikramaditya.

On promotion to the flag rank, he served as the Chief Staff Officer (Training) at Headquarters Southern Naval Command, Kochi and played a key role in the conduct of all training in the Indian Navy. He was simultaneously instrumental in raising the Indian Navy Safety Team that oversees operational safety across all verticals of the Navy. He went on from there to head the work up organisation of the Indian Navy as Flag Officer Sea Training, and was thereafter privileged to tenant the extremely prestigious appointment of Flag Officer Commanding Western Fleet. On completion of an eventful Fleet Command, he was appointed Flag Officer Offshore Defence Advisory Group and Advisor Offshore Security and Defence to the Government of India and functioned in that capacity prior to assuming his current assignment.

Admiral Swaminathan's educational qualifications include a BSc degree from Jawaharlal Nehru University, New Delhi; MSc in Telecommunication from the Cochin University of Science and Technology, Kochi; MA in Defence Studies from King's College, London; MPhil in Strategic Studies from the Mumbai University; and a PhD in International Studies, also from the Mumbai University.

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वाइस एडमिरल कृष्ण स्वामीनाथन ने पश्चिमी नौसेना कमान के चीफ ऑफ स्टाफ के रूप में पदभार ग्रहण किया

वाइस एडमिरल कृष्ण स्वामीनाथन ने 04 नवंबर 2021 को पश्चिमी नौसेना कमान के चीफ ऑफ स्टाफ के रूप में पदभार ग्रहण किया।

01 जुलाई 1987 को भारतीय नौसेना में शामिल हुए एडमिरल स्वामीनाथन संचार और इलेक्ट्रॉनिक युद्ध के विशेषज्ञ हैं और राष्ट्रीय रक्षा अकादमी, खडकवासला, ज्वाइंट सर्विसेज कमांड एंड स्टाफ कॉलेज, श्रीवेनहम, यूनाइटेड किंगडम; नौसेना युद्ध कॉलेज, करंजा; और यूनाइटेड स्टेट्स नेवल वॉर कॉलेज, न्यूपोर्ट, हॉड आइलैंड, यूएसए के पूर्व छात्र हैं।

अति विशिष्ट सेवा पदक और विशिष्ट सेवा पदक हासिल करने वाले एडमिरल स्वामीनाथन ने अपने नौसैनिक करियर में मिसाइल जहाजों आईएनएस विद्युत और विनाश, मिसाइल कार्वेटआईएनएस कुलिश; गाइडेड मिसाइल विध्वंसकआईएनएस मैसूर और विमानवाहक पोतआईएनएस विक्रमादित्य की कमान सहित कई प्रमुख परिचालन, स्टाफ और प्रशिक्षण नियुक्तियों की हैं।

फ्लैग रैंक में पदोन्नति पर, उन्होंने मुख्यालय दक्षिणी नौसेना कमान, कोच्चि में चीफ स्टाफ ऑफिसर (प्रशिक्षण) के रूप में कार्य किया और भारतीय नौसेना में सभी प्रशिक्षणों के संचालन में महत्वपूर्ण भूमिका निभाई। साथ ही उन्होंने भारतीय नौसेना सुरक्षा दल को खड़ा करने में महत्वपूर्ण भूमिका निभाई जो नौसेना के सभी कार्यक्षेत्रों में परिचालन सुरक्षा की देखरेख करता है। वहां से वे फ्लैग ऑफिसर समुद्र प्रशिक्षण के रूप में भारतीय नौसेना संगठन को आगे बढ़ाने के काम का नेतृत्व करने के लिए गए और उसके बाद उन्हें फ्लैग ऑफिसर कमांडिंग वेस्टर्न फ्लीट की अत्यंत प्रतिष्ठित नियुक्ति का सौभाग्य मिला। इस महत्वपूर्ण फ्लीट कमांड के पूरा होने पर, उन्हें भारत सरकार का फ्लैग ऑफिसर ऑफशोर डिफेंस एडवाइजरी ग्रुप और एडवाइजर ऑफशोर सिक्योरिटी एंड डिफेंस नियुक्त किया गया। अपना वर्तमान कार्यभार संभालने से पहले उन्होंने उस क्षमता में कार्य किया।

एडमिरल स्वामीनाथन की शैक्षिक योग्यता में जवाहरलाल नेहरू विश्वविद्यालय, नई दिल्ली से बीएससी की डिग्री शामिल है। उन्होंने कोचीन विज्ञान और प्रौद्योगिकी विश्वविद्यालय, कोच्चि से दूरसंचार में एमएससी; किंग्स कॉलेज, लंदन से रक्षा अध्ययन में एमए; मुंबई विश्वविद्यालय से सामरिक अध्ययन में एमफिल; और मुंबई विश्वविद्यालय से ही अंतरराष्ट्रीय अध्ययन में पीएचडी भी किया है।

<https://pib.gov.in/PressReleasePage.aspx?PRID=1769864>

14th edition of Cyber security conference 'c0c0n' to be inaugurated by General Bipin Rawat

Synopsis

The conference is being held virtually so that people from across the globe can attend the event as the 13th edition of 'c0c0n' last year saw more than 6,000 attendees from around the world.

Chief of Defence Staff General Bipin Rawat will inaugurate the 14th edition of 'c0c0n', an annual Hacking and Cyber Security Briefing, which will be held virtually from November 10-13.

The conference, which is being conducted by Kerala Police in association with two non-profit organisations, Society for the Policing of Cyberspace (POLCYB) and Information Security Research Association (ISRA), would be primarily discussing online scams and defenses during the lockdown period, a press statement said.

"The conference is being held in such a way that online security is beneficial even to children in the state where many crimes are taking place with the shift to online classes," the statement said.

The conference is being held virtually so that people from across the globe can attend the event as the 13th edition of 'c0c0n' last year saw more than 6,000 attendees from around the world.

The conference "aims to discuss at the international level the challenges facing the digital world during the COVID period and the solutions needed to overcome them", the statement said.

"It also provides an information sharing platform on cyber security issues, enhancement of law enforcement agencies/corporates/researchers/academia's effectiveness and efficiency through the improvement of the technical and administrative capabilities in incident handling and a channel to discuss strategic directions and future challenges," it said.

The theme of this year's 'c0c0n' is - Improvise, Adapt and Overcome, it added.

National and international experts will speak on various issues including cyber attacks on critical infrastructures, quantum computing, automotive cyber security, drone attacks detections using deep learning, data security and privacy, cyber espionage and cyber warfare, it further said.

<https://economictimes.indiatimes.com/news/defence/14th-edition-of-cyber-security-conference-c0c0n-to-be-inaugurated-by-general-bipin-rawat/articleshow/87568224.cms>

To encourage more women into cyber security and to offer them equal opportunity to rise to senior leadership roles, Kerala Police is inviting more women, who play prominent roles in cyber security, as speakers for the 14th edition of 'c0c0n', the statement said.

<https://economictimes.indiatimes.com/news/defence/14th-edition-of-cyber-security-conference-c0c0n-to-be-inaugurated-by-general-bipin-rawat/articleshow/87568224.cms>



General Bipin Rawat

Roadmap for ambitious theaterisation plan likely to be firmed up by mid-2022

The actual operationalisation of the theatre commands may take two to three years, they said

India is likely to firm up by the middle of next year a roadmap for rolling out the ambitious theatre commands that are expected to ensure optimum utilisation of the military resources and enhance the country's war-fighting capability, people familiar with the developments said on Sunday. The actual operationalisation of the theatre commands may take two to three years, they said.

According to the plan, each of the theatre commands will have units of the Army, the Navy and the Air Force and all of them will work as a single entity looking after security challenges in a specified geographical territory under an operational commander. At present, the Army, Navy and the Air Force have separate commands. Initially, a plan was firmed up for the creation of an Air Defence Command and Maritime Theatre Command.



According to the plan, each of the theatre commands will have units of the Army, the Navy and the Air Force. (Image: News18)

The theatre commands are being planned to integrate the capabilities of the three services and to ensure optimal utilisation of their resources. Recently, the department of military affairs (DMA) asked the three services to complete their studies on the proposed theatre commands by April so that the plan to create the new structures can be expedited, the people cited above said.

"A roadmap for implementation of the plan to roll out the theatre commands is likely to be firmed up by the middle of next year," said one of the people. Chief of Defence Staff Gen Bipin Rawat has been working on the theaterisation model under which new integrated commands are being envisaged. The theatre commands are being set up under a larger mandate of ensuring synergy among the three service chiefs to deal with future security challenges.

Gen Rawat took over as India's first CDS on January 1, 2020, with a mandate to bring in convergence among the three services and restructure military commands to effectively deal with future security challenges. Separately, the Army is also working on raising new combat formations called the Integrated Battle Groups (IBGs) to further bolster its combat prowess. The IBG, which aims to integrate different components of the Army into the new formation, will include artillery guns, tanks, air defence and logistical elements. Eastern Army Commander Lt Gen Manoj Pande last month said that an in-principle approval has been given to the IBGs which can be mobilised fast.

The Army has already carried out extensive test-bedding of the IBG concept. The IBGs are likely to be headed by Major General-rank officers and could have troops numbering 5,000.

<https://www.news18.com/news/india/roadmap-for-ambitious-theaterisation-plan-likely-to-be-firmed-up-by-mid-2022-4414955.html>

दुश्मन पर होगा अचूक वार: अगले साल तक तैयार होगा सेना के थिएटर कमांड बनाने का रोडमैप, जानें क्या है यह योजना

सार

भारत अगले साल के मध्य तक थिएटर कमांड का रोडमैप तैयार कर सकता है। भविष्य की सुरक्षा चुनौतियों से निपटने के लिए तीनों सेना प्रमुखों के बीच समन्वय सुनिश्चित करने के लिए एक बड़े आदेश के तहत थिएटर कमांड की योजना बनाई जा रही है।

विस्तार

तीनों सेवाओं की क्षमताओं को एकीकृत करने और उनके संसाधनों का सर्वोत्तम उपयोग सुनिश्चित करने के लिए महत्वाकांक्षी थिएटर कमांड की योजना बनाई जा रही है। भारत अगले साल के मध्य तक इस योजना का रोडमैप तैयार करेगा। घटनाक्रम की जानकारी रखने वाले सूत्रों ने रविवार को इसकी जानकारी दी। उन्होंने कहा कि थिएटर कमांड के वास्तविक संचालन में दो से तीन साल लग सकते हैं।

योजना के मुताबिक, प्रत्येक थिएटर कमांड में थल सेना, नौसेना और वायु सेना की इकाइयां होंगी और ये सभी एक परिचालन कमांडर के तहत एक निर्दिष्ट भौगोलिक क्षेत्र में सुरक्षा चुनौतियों की देखभाल करने वाली एक इकाई के रूप में काम करेंगी। वर्तमान में थल सेना, नौसेना और वायु सेना के पास अलग-अलग कमांड हैं। शुरू में एक एयर डिफेंस कमांड और मैरीटाइम थिएटर कमांड के निर्माण के लिए एक योजना तैयार की गई थी।

भविष्य की सुरक्षा चुनौतियों से निपटने के लिए तीनों सेना प्रमुखों के बीच समन्वय सुनिश्चित करने के लिए एक बड़े आदेश के तहत थिएटर कमांड की योजना बनाई जा रही है। चीफ ऑफ डिफेंस स्टाफ जनरल बिपिन रावत भविष्य की सुरक्षा चुनौतियों से निपटने के लिए तीनों सेवाओं के समन्वय और सैन्य कमान के पुनर्गठन पर ध्यान केंद्रित कर रहे हैं। जनरल रावत ने 1 जनवरी 2020 को भारत के पहले सीडीएस के रूप में पदभार ग्रहण किया था। इसमें तीन सेवाओं के बीच अभिसरण लाने और भविष्य की सुरक्षा चुनौतियों से प्रभावी ढंग से निपटने के लिए सैन्य कमांड का पुनर्गठन करने का आदेश दिया गया था।

क्या है थिएटर कमांड?

थिएटर कमांड्स का सबसे सही उपयोग युद्ध के दौरान तब होता है, जब भविष्य की सुरक्षा चुनौतियों से निपटने के लिए तीनों सेना प्रमुखों के बीच समन्वय समन्वय होती है। युद्ध के मौके पर तीनों सेनाओं के बीच तालमेल बनाए रखने के लिए ये कमांड बेहद उपयोगी होता है। यहां से बनी रणनीतियों के अनुसार दुश्मन पर अचूक वार करना आसान हो जाता है। बता दें कि अभी देश में करीब 15 लाख सशक्त सैन्य बल है। इन्हें संगठित और एकजुट करने के लिए थिएटर कमांड की जरूरत है।

<https://www.amarujala.com/india-news/roadmap-for-ambitious-theaterisation-plan-likely-to-be-firmed-up-by-mid-2022>



1 भारतीय सेना (फाइल फोटो) - फोटो : पीटीआई

India prepares for inevitable Chinese actions on its borders

Even as the Chinese leadership is engaging in talks with India, it is accumulating troops and machinery that will stay in the future

By Abhinandan Mishra

New Delhi: Even as the Shatrueet brigade of the Indian army was conducting high altitude area airborne exercise in November first week that included inserting troops, vehicles and missile detachments by using C-130 and AN-32 aircraft from an altitude of 14,000 feet in the heights of Eastern Ladakh, the Chinese People's Liberation Army (PLA) was conducting military exercise in the occupied Aksai Chin area while deploying PCL-181 vehicle mounted Howitzers and PHL-3 long-range multiple rocket launchers.

The timing of the said exercise by the Indian army, involving specialised men and assets of the 50 Independent Parachute Brigade of the Indian Army which is also known as the Shatrueet Brigade, that is headquartered in Agra, is critical as these men are trained to jump into territories that are under the control of the enemy and then wrest it from the enemy forces.



Indian soldiers taking part in a military exercise at Eastern Ladakh (Photo credit: Indian Army)

Just days ago, the PLA had deployed 10 brigades, totalling 10,000 men from its Western Theatre Command who held a live-fire exercise code named Snowland Mission 2021 on the Tibetan plateau at the elevation of 4,500m. The exercise took place in the last week of August, just kilometers away from the Indian border. In June, more than 20 Chinese J-11 and J-16 fighters held drills in the same area even as the talk were taking place between representative of Indian army and PLA to resolve the border tension.

Officials believe that even as Chinese leadership is engaging in talks with India with the intention to resolve the border tension, it is steadily accumulating troops and machines that are going to become a permanent part of its border accumulation in the coming future.

According to sources, the Chinese leadership is using the last 18 months' development as an excuse to strengthen its position in areas where it was weak earlier and even if the situation normalises between the two countries in the coming months, the assets that the PLA has developed in the region in these 18 months, will not be dismantled.

“We are looking at a situation where the PLA has converted temporary placement of troop and machines into permanent fixtures. So, even if the border tension eases, two things are unlikely to happen—thinning of Chinese troops and assets in region where they were not present earlier but have come up in the last one-and-half years and dismantling of the structures that they have built in the region. To put it simply, the possibility of Chinese attempting to ingress into Indian territories has become more prominent,” an official said.

The idea behind conducting exercises that the India army did recently is two-fold, sources said. “To ensure that our men and machine are prepared for any eventuality, and secondly, to give a message to the adversaries that we are ready, this is our preparation, now what you want to do is up to you. Basically, these are steps that are taken by army of any country as deterrent measures,” he added.

The result of the high-altitude insertion exercise, officials said, met all the required parameters and if needed, the same can be done in a real-life situation within hours. “Our Rapid response capabilities have improved several notches in the last few years as that it something we have been focusing on. Our men have the advantage of having the experience of operating in sub-zero temperatures for years now, something which the adversaries don’t and something that requires years of multiple activities,” an army source told The Sunday Guardian.

In the recent exercise, attack helicopters were used to take out ground targets. The possibility of PLA troops entering disputed areas in the coming days and occupying them was a very strong one, sources said and the recent exercise was developed by keeping this scenario in mind.

A Pentagon prepared report, released earlier this week, which is mandated to be shared with the US Congress every year, too, has pointed out the danger of Chinese incursion that India is facing. The more than 190-page report carries a separate chapter titled: “PRC-India border standoff”. The report states that one of the primary reasons behind the Chinese aggression against India is to stop it from deepening its relationship with the United States. “PRC officials, through official statements and state media, had also sought unsuccessfully to prevent India from deepening its relationship with the United States during and subsequent to the standoff, while accusing India of being a mere ‘instrument’ of US policy in the region,” the report reads.

The report also mentions the steps that the PLA has taken in recent months that conforms the hypothesis of Indian officials that the Chinese aggression will continue for the coming time and that the Chinese have used the recent months to build new permanent assets in the region.

“At the height of the border standoff between the PRC and India in 2020, the PLA installed a fiber optic network in remote areas of the western Himalayas to provide faster communications and increased protection from foreign interception”, while adding: “Despite the ongoing diplomatic and military dialogues to reduce border tensions, the PRC has continued taking incremental and tactical actions to press its claims at the LAC. Sometime in 2020, the PRC built a large 100-home civilian village inside disputed territory between the PRC’s Tibet Autonomous Region and India’s Arunachal Pradesh state in the eastern sector of the LAC.”

“The possibility of skirmishes between the Indian army and the PLA in the coming months cannot be ruled out. How these skirmishes will ‘develop’ is something that no one can predict. The best India can do is to prepare itself for the worst and expect that China, which undoubtedly has more number of assets, will face a unified, crippling push back from India and its partner countries if China does something that will cross the proverbial Rubicon line,” a diplomat with a Pacific country said.

<https://www.sundayguardianlive.com/news/india-prepares-inevitable-chinese-actions-borders>

China strengthening connectivity in Chumbi valley: Eastern Command Chief

U.S. report says Beijing continues to take incremental and tactical actions to press its claims at LAC

By Dinakar Peri

New Delhi: China is strengthening connectivity and increasing its depth in Chumbi valley in the Tibet Autonomous Region (TAR), close to India's strategic and vulnerable Siliguri corridor, also called Chicken's neck, according to official sources. Eastern Commander Lt. Gen. Manoj Pande recently termed Siliguri "sensitive".

In its just released annual report 2021 to the U.S. Congress on military and security developments involving the People's Republic of China (PRC), the Department of Defence (DoD) noted that despite the ongoing diplomatic and military dialogues to reduce border tensions, the PRC has "continued taking incremental and tactical actions to press its claims at the Line of Actual Control [LAC]."

"China is building an alternative axis in the Chumbi valley, which is close to the Siliguri corridor. They are increasing their depth by building roads through Bhutanese territory," an official source said. By this it was securing its routes while putting pressure on the Siliguri corridor, which was vital for India, two officials independently stated.

High resolution satellite images that came out last year had shown China building roads along the Torsa river area through Bhutanese territory.

In this context, the recent Memorandum of Understanding (MoU) on a three-step road map between Bhutan and China to speed up their talks for boundary resolution was significant and could have implications for India, a third defence official said on condition of anonymity.

The Siliguri corridor, located in West Bengal, is a stretch of land bordering Bangladesh, Bhutan and Nepal. It measures approximately 170X60km and at the narrowest, it is about 20-22 km.

Narrow piece of land

In a recent conversation, Lt. Gen. Pande observed that the geostrategic significance of the Siliguri corridor came about in terms of it being a narrow piece of land that connects the northeast to the rest of the country through which major national highways, railway line, pipelines, Off-Shore Cable (OFC) connectivity and the rest pass. "It also stems from the fact that the Chumbi valley of the TAR and its proximity to the Siliguri corridor," he stated.

In addition, Lt Gen Pande explained, the other aspect was the demography and its dynamics in that area where there were different demographic composition and different demographic groups who resided there and "related challenges of radicalisation and separatist tendencies whose activities can be inimical to our security interest."

"So, yes, the Siliguri corridor is sensitive to us," he remarked.

On the efforts to address this issue, he stressed that they were looking at a 'whole of the nation approach', wherein not only the security forces, the military and certain other Central Armed Police Forces (CAPF), but also the Governments of the States around the Siliguri corridor and Central agencies were all working together in a coordinated manner to "mitigate this threat in normal times, the hybrid threat as and when it manifests as also during conflict conditions."



"China is building an alternative axis in the Chumbi valley, which is close to the Siliguri corridor. They are increasing their depth by building roads through Bhutanese territory," an official source said.

“Only recently, we have set up a joint coordinating centre under the Army and that has proved to be effective to coordinate actions of all agencies that work there,” he said. He pointed out that at the national level there was a thought process to look at alternate means in terms of economic activities etc to mitigate this threat to the Siliguri corridor.

PLA recruitment drive

The PLA (Peoples Liberation Army) had conducted a month-long recruitment drive in Chumbi valley of around 400 Tibetan persons in August, according to intelligence inputs. The aim was to recruit at least one Tibetan aged 18-40 an household into the PLA militia, one official said, citing the inputs.

“The new recruits from Phari Dzong and Yatung will undergo one-year training at the PLA facilities in Lhasa,” the official disclosed. After the training, they were likely to be deployed on the India-China border, he added.

Earlier in July 2021, the PLA conducted a recruitment drive in Shiquanhe area in Ngari prefecture opposite eastern Ladakh. The recent recruitment of Tibetans into its ranks assume significance in the backdrop of the current stand-off after the Indian Army employed the Special Frontier Force (SFF), comprising Tibetans, to dominate some peaks in the Kailash range on the south bank of Pangong Tso (lake) on the Indian side of the LAC last August.

Village in disputed territory

On China’s continued build-up along the LAC, the DoD annual report revealed: “Sometime in 2020, the PRC built a large 100-home civilian village inside disputed territory between the PRC’s Tibet Autonomous Region and India’s Arunachal Pradesh state in the eastern sector of the LAC.”

Responding to questions on the Chinese “model villages” close to the LAC, Lt. Gen. Pande noted last month that the concern was the dual use nature, civil and military, of these villages. “We have taken note of these in our operational plans,” he observed.

India is also now looking at a plan to populate the border areas along the LAC with the local population.

The DoD report said that Beijing, asserting that its deployments close to the LAC were in response to Indian provocation, had refused to withdraw any forces until India’s forces withdrew behind the PRC’s version of the LAC and ceased infrastructure improvements in the area.

“Beginning in May 2020, the PLA launched incursions into customarily Indian-controlled territory across the border and has concentrated troops at several stand-off locations along the LAC,” the report pointed to the stand-off in eastern Ladakh last year.

It highlighted that the negotiations since between Corps Commanders had yielded “limited disengagement” at “specific areas” along the LAC. As of June 2021, India and China continued to maintain large-scale deployments along the LAC and made preparations to sustain these forces.

<https://www.thehindu.com/news/national/china-strengthening-connectivity-in-chumbi-valley-close-to-siliguri-corridor/article37358027.ece>

NSA Ajit Doval holds strategic dialogue with France

India and France commit to closer cooperation in the Indo-Pacific

By Suhasini Haidar

New Delhi: India and France committed to closer cooperation in the Indo-Pacific through more intelligence sharing and expanding bilateral exercises in the maritime sphere, as National Security Advisor (NSA) Ajit Doval met with French President Emmanuel Macron's diplomatic advisor Emmanuel Bonne in Paris for the annual strategic dialogue, the Indian Embassy announced on Saturday.

“[The two sides] agreed to strengthen bilateral defence and security partnership through enhanced intelligence and information sharing, operational cooperation, bolstering mutual capabilities, expanding bilateral exercises and pursuing new initiatives in maritime, space and cyber domains,” said the release,

giving details of Mr. Doval's meetings, including his discussions with French Foreign Minister Jean-Yves Le Drian and Defence Minister Florence Parly.

The NSA, who is hosting a regional conference on Afghanistan in Delhi on Wednesday, where security officials from Russia, Iran and Central Asian countries are expected to attend, also discussed cooperation with France on the developing situation there.

The two sides also discussed “the continuing challenge of terrorism; and, emerging threats in maritime, cyber and space domains”, the release added.

Mr. Doval travelled to France after accompanying Prime Minister Narendra Modi, who travelled to Rome for the G20 summit and Glasgow for the COP26 climate change summit.

While PM Modi and External Affairs Minister S. Jaishankar have met their counterparts during pull-aside meetings at both conferences as well as at the UN General Assembly in September, the NSA's meeting was the first formal bilateral meeting between India and France since the blow-up over U.S. President Biden's announcement of a new Indo-Pacific alliance with the U.K. and Australia. The alliance meant that Australia's ongoing discussions with France for submarines was shelved, and the French President reacted sharply to the “betrayal” by allies, recalling diplomats and issuing *demarches* over the issue. New Delhi, which was also informed about the new alliance just days before PM Modi's visit to the U.S. for the Quad summit, distanced itself from the alliance, leading to speculation that India would open talks with France for the same submarines.

Readouts on both sides didn't refer to the Aukus alliance, but Indo-Pacific strategy formed a large part of the discussion during the strategic dialogue and other meetings in Paris.

“The strategic partnership of France and India is essential to strengthen multilateralism and the defence of an Indo-Pacific space [that is] free, open and based on the excellent conversation worthy of a trusted strategic partnership,” emphasised Mr. Drian in a tweet.

Defence cooperation is a major pillar of India-France ties and France is one of India's largest defence suppliers. France is also the first country to post a Liaison Officer at the Indian Navy's Information Fusion Centre for the Indian Ocean Region, and the first country with which India has done joint patrols. *(With inputs from Dinakar Peri)*

<https://www.thehindu.com/news/national/nsa-ajit-doval-holds-strategic-dialogue-with-france/article37360019.ece>



NSA Ajit Doval with French Defence Minister Florence Parly during his visit to France. | Photo Credit: PTI/Twitter/@IndiaambFrance

India, France to expand defence, security partnership

India and France resolved to expand their defence ties at a meeting of India-France strategic dialogue in Paris on Friday that was co-chaired by NSA Ajit Doval and Emmanuel Bonne, the Diplomatic Advisor to French President Emmanuel Macron.

New Delh: In a significant move, India and France agreed to strengthen defence and security partnership by enhancing intelligence and information sharing, bolstering mutual capabilities, expanding military drills and pursuing new initiatives in maritime, space and cyber domains.

The two countries resolved to expand the defence ties at a meeting of India-France strategic dialogue in Paris on Friday that was co-chaired by NSA Ajit Doval and Emmanuel Bonne, the Diplomatic Advisor to French President Emmanuel Macron.

The Indian embassy in Paris said France reiterated its commitment to fully support Prime Minister Narendra Modi's vision of 'Atmanirbhar Bharat' and defence industrialisation, joint research and technology development in India across a wide range of advanced capabilities.

France's resolve to expand strategic cooperation with India came nearly two months after the unveiling of a new security alliance (AUKUS) by Australia, the UK and the US that had infuriated the French government.

The Indian delegation at the dialogue was led by Doval while the French side was headed by Bonne.

The French delegation included Admiral Jean-Philippe Rolland, the Chief Military Advisor to the French President.

Doval also met Jean-Yves Le Drian, Minister of Foreign Affairs, and Florence Parly, Minister of Armed Forces, the embassy said in a statement.

It said the two sides discussed the global security environment, including current developments and long term challenges in the Indo-Pacific, the situation in Afghanistan, Africa, Southeast Asia and West Asia, the continuing challenge of terrorism and emerging threats in maritime, cyber and space domains.

The embassy said it was agreed that the emerging trends in global affairs reinforce the need for closer partnership between India and France, including in the UN Security Council and other UN forums.

It said the two sides will pursue these objectives through enhanced bilateral cooperation, deepening engagement in regional institutions and forums and jointly working with and assisting other countries in the Indo Pacific region.

"They agreed to strengthen bilateral defence and security partnership through enhanced intelligence and information sharing, operational cooperation, bolstering mutual capabilities, expanding bilateral exercises and pursuing new initiatives in maritime, space and cyber domains," the embassy said.

"France reiterated its commitment to fully support Prime Minister Narendra Modi's vision of Atmanirbhar Bharat and defence industrialisation, joint research and technology development in India across a wide range of advanced capabilities, based on long-standing cooperation and mutual trust," it said.



NSA Ajit Doval meets French Defence Minister Florence Parly in France. (PTI Photo)

In the Strategic Dialogue and other meetings, France stressed its continuing commitment to the Indo-Pacific region as a "resident power", and partnership with India as a "major pillar" of its strategy for the region.

"Doval reiterated that France is one of India's premier global and Indo-Pacific partners," the embassy said.

It said the two sides reaffirmed the vision articulated by Modi and Macron, most recently during their meeting on the margins of the G20 Summit in Rome, that their strategic partnership has a vital role to play in advancing peace, stability and security in the Indo-Pacific region based on democratic values and a common belief in strategic autonomy and rule of law.

"India welcomed EU's Indo Pacific strategy and looked forward to French presidency of the European Union in the first half of 2022 as an opportunity to give further shape to EU's engagement in the Indo Pacific region, including in security, connectivity, sustainability and economic development," the embassy said.

Building on the successful India-France initiative on International Solar Alliance, the two sides stressed the need to accelerate cooperation in clean energy, including civil nuclear energy and green hydrogen, it said.

The assertion by France to deepen cooperation with India in the Indo-Pacific came nearly two months after the AUKUS deal.

Under the deal, Australia will get technology from the US and UK to build nuclear-powered submarines.

The alliance is seen as an effort to counter China's growing assertiveness in the South China Sea.

France reacted angrily to the formation of the new alliance as it resulted in Paris effectively losing a multi-billion dollar deal to build 12 conventional submarines for Australia. France was also upset over its exclusion from the alliance.

<https://www.indiatoday.in/india/story/india-france-expand-defence-security-partnership-1873891-2021-11-07>

Making sense of hypersonic missiles

This is the new 'strategic' weapon that every big power wants for Christmas

By Gwynne Dyer

I saw in some of the newspapers they used the term 'Sputnik moment'," said General Mark Milley, chairman of the US Joint Chiefs of Staff. "I don't know if it's quite a Sputnik moment, but I think it's very close to that. It's a very significant technological event that occurred."

Sputnik was the first artificial satellite, launched by the Soviet Union in 1957. Shocked Americans responded by creating NASA, but also by speeding up their embryonic ballistic missile programme. The tired old 'bomber gap' was replaced by the more convincing (although equally imaginary) 'missile gap', and US spending on new weapons soared. It may be happening again.



What got Milley's attention last week was China's testing of a hypersonic missile that flew all the way around the world, skipping along the top of the atmosphere unlike traditional 'ballistic' missiles that go very high (ca. 2,000 km.) and then come down steeply. It can carry nuclear weapons, of course.

This is the new 'strategic' weapon that every big power wants for Christmas. China's test virtually guarantees extra funding for the American version, whose first full test flight is only scheduled for the autumn of 2022. Russia already has a more or less operational hypersonic missile, and India and North Korea are working on them.

But hypersonic weapons are completely pointless in a nuclear role, and dangerous to deterrence even in a non-nuclear version, so why is there such enthusiasm for them?

Hypersonic missiles are definitely cool. They can fly all the way around the world and approach a target from anywhere. Chinese hypersonic weapons could be coming up over the South Pole to attack the US, for example. That makes them harder to intercept, because the curvature of the Earth hides them until they are quite close to the target, and even harder to stop because they can also manoeuvre on the way in.

But ballistic missiles can already come from any direction, thanks to the magic of missile-firing submarines. And the hypersonic gliders are basically just glorified cruise missiles, although they are moving five to ten times faster. Harder to shoot down, again, but so what?

Forty years after Ronald Reagan's 'Star Wars' fantasy, there is still no country that has anti-missile defences capable of intercepting more than a few ballistic missiles at a time. In a real nuclear war there would be hundreds coming, and the great majority would get through.

So for more than half a century, few serious strategists have wasted their time trying to build a comprehensive defence against nuclear-tipped missiles. The only real defence against a surprise attack is the guaranteed ability to retaliate with your own nuclear weapons even if the other side attacks first: deterrence.

Faster missiles, stealthier missiles, smarter missiles don't make any difference. Deterrence is a business of numbers and brute force, and hypersonic missiles with nuclear warheads don't change the rules of deterrence in any appreciable way. Air and space defence is always a matter of attrition, and some of the missiles will always get through.

Theoretically, there could be a role for hypersonic missiles with 'conventional' warheads that target single high-value targets at very long range. This is actually the sole, publicly acknowledged

goal of the American hypersonic programme, that suggests at least a residual rationality in the Pentagon. But how do you convince the target government that the incoming hypersonic missile is not nuclear in the three or five minutes after it comes up on their radar? You can't. The whole hypersonic game is a dangerous and needless complication of a deterrent system that has remained reasonably stable for at least three decades now.

(Gwynne Dyer's new book is 'The Shortest History of War'. The views expressed are personal.)

<https://www.dailypioneer.com/2021/columnists/making-sense-of-hypersonic-missiles.html>



Sat, 06 Nov 2021

China launches new ballistic missile submarine that can strike US mainland from Indo-Pacific itself

By Aashish Dangwal

China's rapidly expanding fleet of nuclear-powered submarines has long been a cause of concern for the US, as it is equipped with one of the most powerful submarine-launched ballistic missiles (SLBM).

According to the South China Morning Post, China's newly commissioned nuclear-powered submarine could pose a big threat to the US mainland. In recent years, Beijing has worked significantly towards the development of long-range SLBMs.

On November 3, the Pentagon presented the unclassified version of its yearly report on Chinese military and security developments to the US Congress. Beijing's nuclear weapons program received a lot of attention in this report.



China's Type 94 Jin-class ballistic missile submarine. (Wikipedia)

New information about China's (SLBM) and nuclear ballistic missile submarine (SSBN) fleets is included in this report. It also contains information on the Pentagon's assessment of these Chinese unwater vessels.

The People's Liberation Army Navy (PLAN) currently has six Type 094 SSBNs, commonly known as the Jin-class, each capable of carrying 12 JL-2 SLBMs.

A new Type 096 SSBN, as well as a JL-3 SLBM, are currently being developed. China's new SLBM is believed to allow it to attack the United States' mainland without leaving its waters or, in some cases, its ports.

China's submarine fleet is expected to grow from 66 boats now to 76 by 2030, according to an unclassified analysis by the US Office of Naval Intelligence (ONI). This will include the construction of six new nuclear-powered attack submarines at the Bohai yard in Huludao.

The JL-2 SLBM

The JL-2 is an upgrade to the previous JL-1 ballistic missile, which is still in use on Type 092 ballistic missile submarines. It features a larger diameter and length, as well as a longer range and payload.

The Julang-2 (JL-2) SLBMs are carried by Type 094. Each SLBM is claimed to carry a single nuclear warhead and has a range of between 7,400 and 8,000 km.

If JL2 is launched from waters near China, it has sufficient range to attack regional nuclear powers such as Russia and India, but cannot reach the US mainland. However, it can threaten Guam, Hawaii, and Alaska.

Despite the fact that the distance between Beijing and Los Angeles is over 10,000 miles, a Type 094 submarine equipped with JL-2, patrolling near Alaska could target the majority of the US.

According to SCMP, each JL2 missile can be armed with a single megaton warhead – 67 times more powerful than the Little Boy bomb dropped on Hiroshima, or with three to eight small, multiple independently targetable re-entry vehicles (MIRVs).

China's Type 094-Class Submarine

Type 094 is the PLAN's only nuclear-capable submarine. The platform is China's "first credible sea-based nuclear deterrent," according to the US Department of Defense. China has developed four Type 094 SSBNs and two Type 094A variants with significant upgrades.

The Jin-class submarine is China's second-generation nuclear-powered submarine and it is the direct successor to Type 092 or Xia-Class nuclear submarines. It was first introduced in 2007 and went into operation in 2010.

Although Type 094 is a substantial upgrade over China's first SSBN, it still has severe flaws. Type 094 is said to be louder than the current US and Russian boomers, and according to the US Office of Naval Intelligence, Type 094 is noisier than the Delta III SSBN, first launched by the Soviet Union in 1976.

According to a report, the Jin-class may be traceable due to a design defect near the missile hatches at the back of the hull, which could generate a detectable sonar signal. China's defense sector is infamous for keeping information regarding weapon system advancements under wraps.

As a result, determining how quiet the Jin-class is to an absolute degree of accuracy is challenging.

Type 096-SSBN & JL-3 SLBM

China is currently developing its next generation of SSBNs, the Type 096, which might bolster the PLA's nuclear deterrent at sea. The JL-3 SLBM, which is not yet operational, is expected to be mounted on Type 096.

The new SLBM is expected to have a range of about 10,000 km and is capable of carrying multiple warheads on numerous targetable reentry vehicles (MIRVs). According to the Department of Defense, China could field up to eight SSBNs by 2030, with Type 094s and Type 096s operating simultaneously.

The Type 094 platform is said to be capable of carrying up to sixteen JL-3 missiles, while the Type 096 submarines can carry as many as 24 of these SLBMs.

According to the Pentagon's newest China report, "Type 096 SSBN apparently will be armed with a follow-on SLBM, and construction will likely commence in the early 2020s." Six Type 096 submarines are planned and the construction is believed to have started in early 2021.

Talking about its other submarines, the PLAN has made significant investments to deploy a modernized SSBN force over the coming decades. There are six Type 094 submarines, with two more planned for a total of eight.

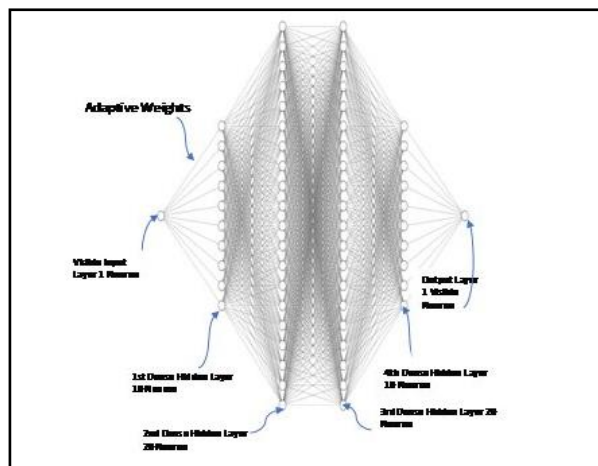
At least one 1980s Type 092 "Xia" class submarine, equipped with older and less capable JL1A SLBMs until it is phased out by additional Type 094A models.

<https://eurasianimes.com/china-launches-new-ballistic-missile-submarine-that-can-strike-us-mainland-from-indo-pacific-itself/>

Prediction of optical constants and bandgap energy of 3D nanonetwork silicon

In a new publication from *Opto-Electronic Advances*, Shreeniket Joshi and AmirKianoosh Kiani from Ontario Tech University, Ontario, Canada, discuss hybrid artificial neural networks and analytical model for prediction of optical constants and bandgap energy of 3D nanonetwork silicon structures.

This study introduces a reliable method to determine optical properties for novel silicon thin films (nanomaterial). Silicon thin films were deposited on glass by bombarding silicon wafers with pulsed laser beams. Finding optical properties of novel nanomaterials is challenging as limited experimental data is available. The existing models for finding optical properties were found to be complex and prone to errors, this study proposes a new method of using analytical models with artificial neural networks. The purpose of using artificial neural networks was to develop a mathematical function to predict optical constants for novel thin films. This method proposed was found to be 95 percent accurate.



Deep learning model developed. Credit: Compuscript Ltd

The research group of Dr. AmirKianoosh Kiani from Ontario Tech University proposed this study to find optical properties of novel silicon thin films and the method was validated with conclusive proof to be accurate and reliable. For transparent novel materials, optical properties can be determined using experimental data for transmittance and reflectance. However, it's challenging to do the same for opaque materials as in this case only reflectance data is available. This study can be used to establish a mathematical relation between the available experimental data and shows promising potential for predicting optical properties for opaque materials from reflectance data alone.

Further, the optical properties determined for the novel silicon thin film discussed in this study was found to have an energy band gap of 1.648, this value is close to materials used for harvesting solar energy. As silicon thin films have a phenomenal surface area, a material with this energy band gap can prove to be highly efficient in solar applications. The research group also intends to use this method for exciting materials like titania, gold nanoparticles, etc. which are used in biomedical applications.

More information: Shreeniket Joshi et al, Hybrid artificial neural networks and analytical model for prediction of optical constants and bandgap energy of 3D nanonetwork silicon structures, *Opto-Electronic Advances* (2021). DOI: [10.29026/oea.2021.210039](https://doi.org/10.29026/oea.2021.210039)

<https://phys.org/news/2021-11-optical-constants-bandgap-energy-3d.html>

Novel plasmonic solar thermal materials developed to reserve sun heat

By Xi Min

Recently, researchers developed high-performance solar thermal copper sulfide photothermal ink and photothermal film, marking big progress in the field of Plasmonic Solar photothermal Materials.

The team was led by Prof. Wang Zhenyang from the Institute of Solid State Physics, Hefei Institutes of physical science, Chinese Academy of Sciences. The relevant results were published on *Nano Research*.

Scientists have been seeking strategies to achieve high efficient solar energy utilization for various applications, such as: solar water heaters, energy-saving buildings, drying systems and other fields.

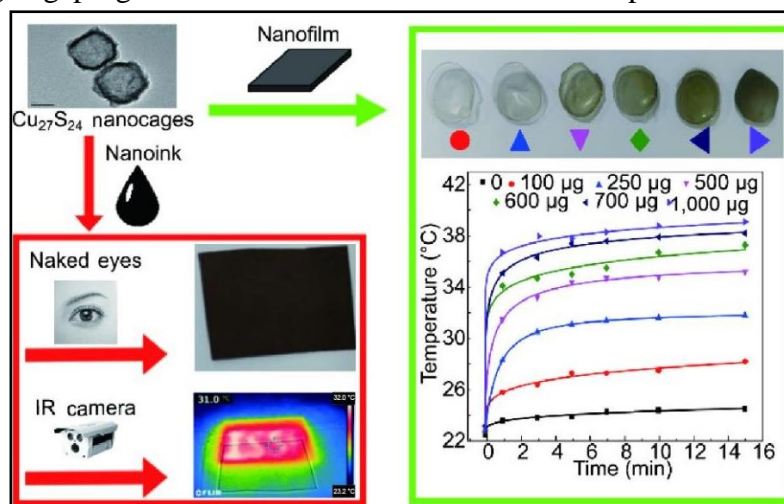
In this study, researchers used the Kirkendall reaction to synthesize hollow copper sulfide ($\text{Cu}_{27}\text{S}_{24}$) nanocages. Compared to traditional noble metal plasmonic nanomaterials (gold or silver), which shows plasmon photothermal phenomena given the condition of illumination with visible light, $\text{Cu}_{27}\text{S}_{24}$ nanocages as semiconducting material that have lower interband transition and scattering loss. Besides, the hollow nanocage structure can further expand the available light harvesting range and further improve the light-to-heat conversion efficiency.

The researchers combined first-principles calculations and finite element method (FEM) simulations to fit the optical properties of the nanocage, and predicted its excellent solar photothermal performance. Based on the evaluation results, solar photothermal nanoink and nanofilm were further developed. This work preliminarily proves that the hollow copper sulfide nanocage has broad prospects in plasmonic photothermal applications.

More information: Min Xi et al, Plasmonic $\text{Cu}_{27}\text{S}_{24}$ nanocages for novel solar photothermal nanoink and nanofilm, *Nano Research* (2021). DOI: [10.1007/s12274-021-3880-3](https://doi.org/10.1007/s12274-021-3880-3)

Journal information: [Nano Research](https://www.nature.com/nanoresearch)

<https://phys.org/news/2021-11-plasmonic-solar-thermal-materials-reserve.html>



$\text{Cu}_{27}\text{S}_{24}$ nanocage was synthesized and evaluated by a combination of experimental measurement and theoretical calculation. And the developed $\text{Cu}_{27}\text{S}_{24}$ "nanoink" and $\text{Cu}_{27}\text{S}_{24}$ nanocage was synthesized and evaluated by a combination of experimental measurement and theoretical calculation. And the developed $\text{Cu}_{27}\text{S}_{24}$ "nanoink" and

Scientists develop microscopic calibration tool with fluorescent nanodiamonds

By Evan Anderson

Hyderabad: Council of Scientific and Industrial Research (CSIR) director general Dr Shekhar C how and when it will strike.

Jewelers, geologists, and microscopists agree: diamonds are forever. Researchers at the University of Illinois Urbana-Champaign are using microscopic nanodiamonds to calibrate and assess the performance of high-powered microscopes. Their longevity and durability make the tiny "first-aid kits" more than up to the task.

Advanced optical microscopy systems provide high-resolution views of the structure and function of cells and molecular compounds. Developing a stable fluorescent nanodiamond phantom promises wide-reaching applicability for microscopy research and quality control alike.

"There is potential that this is going to become a standard calibration tool in fluorescence microscopy worldwide. This sample is so convenient, and so easy to use, that it is hopefully going to make a large impact," said Mantas Žurauskas, an imaging research scientist for the GlaxoSmithKline Center for Optical Molecular Imaging at the Beckman Institute for Advanced Science and Technology, who led the research.

The team's paper, "Fluorescent nanodiamonds for characterization of nonlinear microscopy systems," was published in *Photonics Research*.

Fluorescent nanodiamonds are microscopic particles with small amounts of other chemical elements trapped inside as impurities. Žurauskas' research establishes their efficacy for producing stable microscopic images.

"[They] are unique in the way that they do not bleach," Žurauskas said. "Each time you look at them, they look the same. That's very rare in fluorescence microscopy."

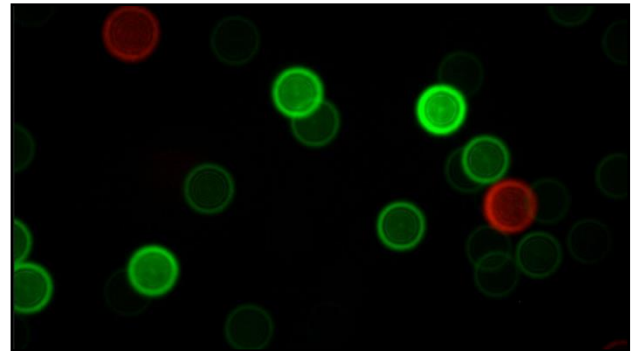
Creating reliable calibration samples, called phantoms, is a challenge in biomedical microscopy imaging.

"There are changes each time you look at a fluorescent structure. As phantoms, I used fluorescent beads very often, these are like little beads filled with fluorescent dye. Each time you look at them, they are a bit dimmer. It's really this fluorescence decay that is a big enemy in fluorescence microscopy," Žurauskas said.

The stability of a calibration sample is fundamental to assessing the optical system's day-to-day quality.

"It's kind of a first-aid kit for a microscope," said Žurauskas. "Ideally, we want to take the same object each time and see the same image."

Nanodiamonds' stability and longevity allows their continuous reuse as a calibration tool, eliminating the labor-intensive preparation researchers typically undergo.



Microscopy image of fluorescent nanodiamonds, a calibration tool developed by researchers at the University of Illinois Urbana-Champaign in collaboration with industry partner GlaxoSmithKline. The nanodiamonds' longevity and durability make them a microscopic "first-aid kit" that stands the test of time. Credit: Beckman Institute for Advanced Science and Technology

Beckman's collaborative research environment was critical to engineering this robust, easy-to-use imaging phantom.

"[Professor and GSK Center Co-Director] Stephen Boppart created a unique environment, and a unique range of expertise so that people can meet in the corridors, can talk about the challenges they are facing daily, and find these unique solutions that are only possible in this sort of environment," Žurauskas said.

Boppart also emphasized the unique interdisciplinary nature of this research.

"We have this large interdisciplinary lab that does end-to-end development and application, so we develop laser sources, we develop microscopes, and we use those microscopes to do the biological and medical research, even clinical human studies. These nanodiamonds and phantoms are just one example where we also develop new tools to catch up with the development of the microscopy systems that we do.

"This interdisciplinary and highly collaborative element was extremely important for this research to happen," Boppart said.

How are the phantoms engineered?

Žurauskas explains: "The nanodiamonds are distributed randomly, and they are very sparse, so that you can look at individual particles, or on the opposite end of the spectrum you can look at dense distributions of these particles. A second plane contains a viewfinder grid, which is effectively a laser-machined grid with nanodiamonds embedded in it. This helps to find the same area each time."

Partners in industry are evaluating the imaging phantom for wider use.

"We currently have two companies evaluating the phantom. One company is LiveBx, a small spinoff of the university. That particular company is interested in how these phantoms can be used to improve their system," said Žurauskas.

Industry partner GlaxoSmithKline is also working to assess the new phantom for quality control applications in its own biomedical research labs.

The technology represents an important scientific advancement for calibrating microscopy systems and the images they generate, and points toward future research in creating more advanced and stable phantoms.

More information: Mantas Žurauskas et al, Fluorescent nanodiamonds for characterization of nonlinear microscopy systems, *Photonics Research* (2021). DOI: [10.1364/PRJ.434236](https://doi.org/10.1364/PRJ.434236)

<https://phys.org/news/2021-11-scientists-microscopic-calibration-tool-fluorescent.html>

DNA Explainer: COVID-19 virus more deadly for South Asians, research brings out startling revelations

The research states that around 60% of people from South Asia and 15% of people of European ancestry carry the high-risk version of the gene

The threat of the COVID-19 infection is still looming large over the world. Amid this, new research has revealed that South Asian people have a gene that significantly increases the risk of lung damage and lung infection from COVID-19. Due to this gene, the death rate from coronavirus infection increases in South Asian people.

The research conducted by Oxford University has warned South Asians to be extra cautious with COVID-19. The research further states that around 60% of people from South Asian backgrounds and 15% of people of European ancestry carry the high-risk version of the gene.

Research has found that the LZTFL1 (LZTFL1) gene alters the response capacity of the lungs to a viral infection. Researchers say that this is the most important genetic risk factor in the research done so far. COVID-19 vaccines are key and help significantly reduce these risks, researchers say.

Why South Asians are at higher risk from COVID-19?

Researchers used a combination of artificial intelligence and new molecular technology to spot the gene called LZTFL1.

The research found that the LZTFL1 gene blocks key protective mechanisms of the lungs to a viral infection.

The lungs are not able to work to their full capacity due to which cells become weak and the COVID-19 virus easily attacks the body.

The risky version of the gene is present in about 2% of people from African-Caribbean backgrounds and 1.8% of people of East Asian descent.

Socio-economic factors were also likely to be important in explaining why some communities have been particularly badly affected by the pandemic.

It also shows that the people with the higher risk gene are likely to particularly benefit from vaccination and the risk of death is reduced.

Scientists say it is significant that the gene involved affects the lungs, but does not have an impact on the immune system.

However, the research states complex mix of factors including age in particular contributed to each person's individual risk.

<https://www.dnaindia.com/world/report-dna-explainer-covid-19-virus-more-deadly-for-south-asians-research-brings-out-startling-revelations-2918612>

