

# समाचार पत्रों से चयित अंश Newspapers Clippings

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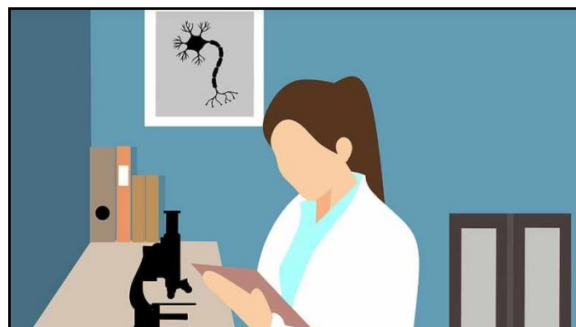
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## Prez Kovind to present young women scientists award for excellence in social tech on Feb 28

Pune: President Ram Nath Kovind will confer the National Award for Young Woman Showing Excellence Through Application of Technology for Societal Benefits on women scientists for their research achievements and for application of technology for the societal benefits at the National Science Day (NSD) function at Vigyan Bhawan on 28 February.

The National Award for Young Woman Showing Excellence Through Application of Technology for Societal Benefits will be given to Dr Shweta Rawat, DRDO DIPAS, Delhi & Dr Shalini Gupta, IIT Delhi.

Rawat from Defence Institute of Physiology and Allied Sciences (DIPAS), DRDO, Timarpur, Delhi and her team developed a female-specific full-body protector (Prabala) to safeguard the Female troops deployed in riot control actions for the first time. This gear has been developed in collaboration with the Rapid Action Force using the ergonomic design principle based on anthropometric dimensions specific for female troops. The full-body protector has unique properties of anti-stab, anti-puncture, flame retardant and acid resistance. It is designed to assure greater comfort and flexibility to the women forces while deployed in law and order maintenance duties.



Gupta from the Department of Chemical Engineering, Indian Institute of Technology (IIT), Delhi, has successfully led the development of a technology Septiflo™, which offers fast and affordable assay for point-of-care diagnosis and treatment of bacterial septicaemia. Bacterial septicaemia is one of the biggest in-hospital killers worldwide. This has led to the incubation of the start-up, Nano DX Healthcare Pvt Ltd. She is pursuing unconventional approaches to design novel bio-systems for medical diagnosis, drug delivery and biomaterials fabrication on a chip. A prototype diagnostic kit, using naturally amplified pathogen-derived endotoxins for early bedside diagnosis of bacteremia has been developed, which is currently undergoing clinical trial. In drug delivery systems, cancer and bacterial therapies have been combined into a single delivery platform in order to co-eliminate cancer and bacterial infections residing inside cancer.

The Department of Science & Technology (DST) has been celebrating 28 February as National Science Day (NSD) each year. It is the day Raman Effect, a landmark in scientific discoveries, was announced by Dr CV Raman. The celebration consists of lectures, demonstrations, exhibitions, quiz programmes, awards and other activities for students and the masses. This year, President Kovind will be awarding science communicators and women scientists on the occasion.

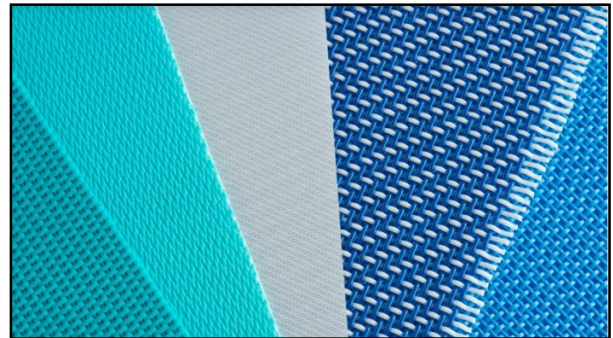
<https://indusdictum.com/2020/02/26/prez-kovind-to-present-young-women-scientists-award-for-excellence-in-social-tech-on-feb-28-2/>

## Govt OKs Technical Textiles Mission; CSIR, DRDO, IITs to research

New Delhi: The Cabinet Committee on Economic Affairs, chaired by the Prime Minister Narendra Modi, has given its approval to set up a National Technical Textiles Mission with a total outlay of Rs 1,480 crore, with a view to positioning the country as a global leader in technical textiles. The Mission would have a four year implementation period from FY 2020-21 to 2023-24.

Technical textiles are a futuristic segment of textiles, which are used for various applications ranging from agriculture, roads, railway tracks, sportswear, health on one end to bulletproof jacket, fireproof jackets, high altitude combat gear and space applications on the other end.

The Mission will have four components: Component -I (Research, Innovation and Development), Component -II (Promotion and Market Development), Component - III (Export Promotion) and Component- IV (Education, Training, Skill Development).



Research, Innovation and Development, with an outlay of Rs 1,000 Crore, will promote both fundamental research at fibre level aiming at path-breaking technological products in carbon fibre, aramid fibre, nylon fibre, and composites, and application-based research in geo-textiles, agro-textiles, medical textiles, mobile textiles and sports textiles and development of biodegradable technical textiles.

The fundamental research activities will be based on 'pooled resource' method and will be conducted in various Centre for Scientific & Industrial Research (CSIR) laboratories, Indian Institute of Technology (IIT) and other scientific/industrial/academic laboratories of repute. Application-based research will be conducted in CSIR, IIT, Research Design & Standards Organisation (RDSO) of Indian Railways, Indian Council of Agricultural Research (ICAR), Defence Research & Development Organisation (DRDO), National Aeronautical Laboratory (NAL), Indian Road Research Institute (IRRI) and other such reputed laboratories.

Indian Technical Textiles segment is estimated at \$16 billion which is approximately 6% of the \$250 billion global technical textiles market. The penetration level of technical textiles is low in India varying between 5-10% against the level of 30-70% in developed countries. The Mission will aim at an average growth rate of 15-20% per annum taking the level of domestic market size to \$40-50 billion by the year 2024, through market development, market promotion, international technical collaborations, investment promotions and 'Make in India' initiatives.

The third component aims at export promotion of technical textiles enhancing from the current annual value of approximately Rs 14,000 crore to Rs 20,000 crore by 2021-22 and ensuring 10% average growth in exports per year up to 2023-24. An Export Promotion Council for Technical Textiles will be set up for effective coordination and promotion activities in the segment.

Education, skill development and adequacy of human resources in the country is not adequate to meet the technologically challenging and fast-growing technical textiles segment. The Mission will promote technical education at higher engineering and technology levels related to technical textiles and its application areas covering engineering, medical, agriculture, aquaculture and dairy segments.

Skill development will be promoted and an adequate pool of highly skilled manpower resources will be created for meeting the need of relatively sophisticated technical textiles manufacturing units.

The Mission will focus on the usage of technical textiles in various flagship missions and programmes of the country including strategic sectors. The use of technical textiles in agriculture, aquaculture, dairy, poultry, Jal Jivan Mission, Swachh Bharat Mission, and Ayushman Bharat will bring an overall improvement in cost economy, water and soil conservation, better agricultural productivity and higher income to farmers per acre of landholding in addition to promotion of manufacturing and exports activities in India.

The use of geotextiles in highways, railways and ports will result in robust infrastructure, reduced maintenance cost and higher life cycle of the infrastructure assets. Promotion of innovation amongst young engineering /technology/ science standards and graduates will be taken up by the Mission along with the creation of innovation and incubation centres and the promotion of start-ups and ventures. The research output will be repositied with a 'trust' with the Government for easy and assessable proliferation of the knowledge thus gained through research innovation and development activities.

A sub-component of the research will focus on the development of biodegradable technical textiles materials, particularly for agro-textiles, geo-textiles and medical textiles. It will also develop suitable equipment for environmentally sustainable disposal of used technical textiles, with emphasis on safe disposal of medical and hygiene wastes.

There is another important sub-component in the research activity aiming at the development of indigenous machinery and process equipment for technical textiles, in order to promote 'Make In India' and enable competitiveness of the industry by way of reduced capital costs.

A Mission Directorate in the Ministry of Textiles headed by an eminent expert in the related field will be made operational. The Mission Directorate will not have any permanent employment and there will be no creation of building infrastructure for the Mission purpose. The Mission will move into the sunset phase after four years period.

Technical textiles are textiles materials and products manufactured primarily for technical performance and functional properties rather than aesthetic characteristics. Technical Textiles products are divided into 12 broad categories (agrotech, buildtech, clothtech, geotech, hometech, indutech, mobiltech, meditech, protech, sportstech, oekotech, packtech) depending upon their application areas.

India shares nearly 6% of world market size of \$250 billion. However, the annual average growth of the segment is 12%, as compared to 4% world average growth. The penetration level of technical textiles is low in India at 5-10%, against 30-70% in advanced countries. The Mission aims at improving the penetration level of technical textiles in the country.

<https://indusdictum.com/2020/02/26/govt-oks-technical-textiles-mission-csir-drdo-iits-to-research-2/>

## Army Chief reviews security along LoC

**Srinagar, February 26** Army Chief Gen MM Narvane on Wednesday concluded his two-day visit to Kashmir during which he reviewed the security arrangements and took stock of summer strategy.

This is General Naravane's first visit to Kashmir after taking over as the Chief of Army Staff. He reached Kashmir on Tuesday and visited the formations and units deployed along the Line of Control. He was accompanied by the Northern Army Commander, Lt Gen YK Joshi and Chinar Corps Commander, Lt Gen KJS Dhillon.



"The COAS was briefed by the local Commanders about the situation on the LoC, ceasefire violations, retaliations, counter infiltration operations and operational preparedness being maintained," Srinagar-based defence spokesman stated.

"During his interaction with the soldiers on snow-clad heights, he was appreciative of the sharp vigil and alertness along the Line of Control and high morale of the troops."

The Army Chief also exhorted the soldiers to remain alert for any eventuality. "He further reinforced the need to be prepared to meet the emerging security challenges effectively at all times," the statement added.

Sources said the Army Chief also took stock of the summer strategy for the hinterland and LoC. Currently, almost all passes along the LoC are blocked with snow, but with snow melting over the next few weeks, the attempts of infiltration might gain momentum.

The spokesman said the COAS was earlier briefed by the Chinar Corps Commander at Badami Bagh Cantonment on the overall situation along the Line of Control and the hinterland. The COAS also interacted with senior officials of the administration and Security Forces.

<https://www.tribuneindia.com/news/army-chief-reviews-security-along-loc-47777>

## Navy all set to get new copters in 12 months

The Indian Navy will start getting the anti-submarine warfare helicopters this year itself. The first lot of six out of the 24 MH-60R helicopters, agreed upon after the India-US bilateral talks yesterday, will be delivered in 12 months and the remaining will follow up over the next four years, sources in the Indian Navy said.

The copters made by Sikorsky, a company owned by Lockheed Martin of the US, are considered the best among the class to hunt submarines with their sea-dunking sonars and the ability to launch submarine killing torpedoes and also arsenal-like missiles at targets at sea.

Dan Spoor, Vice-President, Sikorsky Maritime and Mission Systems, said, “We stand behind the US Navy and look forward to having the Indian Navy become the fourth international country joining Australia, Denmark and Saudi Arabia to operate the MH-60R.”

Spoor said the platform would provide the Indian Navy the capability to identify, engage and defeat maritime security threats along with the ability to perform secondary missions, including search and rescue.

The MH-60R is the same variant as used by the US Navy. It will replace the 40-year-old fleet of British-made Sea King 42-B helicopters. Over 300 MH-60R Seahawk helicopters are operating worldwide. India has opted to get Mk-54 torpedoes on board the new machine.

The copter was finalised along with additional purchase of six additional Apache AH64E copters. *The two copters would cost \$3 billion. The IAF is already flying the Apache AH 64E copter.*

<https://www.tribuneindia.com/news/navy-all-set-to-get-new-copters-in-12-months-47593>

## THE ECONOMIC TIMES

Thu, 27 Feb 2020

### Decisive strike capability upgrade for Air Force still to be achieved

*The game-changing Rafale fighter jets will only start arriving by May and other measures, including a plan to upgrade the air-to-air combat capability of the rest of the fleet are still in the works. Conversations on an additional 36 jets that will cost significantly less than the original order of € 7.6 billion have started but the order is nowhere close to being placed*

*By Manu Pubby*

NEW DELHI: A year after the Balakot airstrikes and the ensuing air battle the next day on the Line of Control (LoC), a lot of plans have been implemented but a decisive strike capability upgrade for the Indian Air Force is still to be achieved.

The game-changing Rafale fighter jets will only start arriving by May and other measures, including a plan to upgrade the air-to-air combat capability of the rest of the fleet are still in the works. The biggest lesson of the air skirmish, in which Wing Commander Abhinandan Varthaman’s aircraft was shot down across the border, was the lack of an edge over the US supplied AMRAAM beyond-visualrange missiles that are in service with the Pakistan Air Force (PAF).

The engagement range of the AIM-120 AMRAAM, fired from F-16s with PAF, forced Indian fighters to take evasive manoeuvres on February 27 last year. The Indian Su-30MKI and Mirage-2000 fighters that had been scrambled to take on the enemy fighters could not get a firing solution on F-16s as both their radars and weapons were outranged by the American supplied missiles. It was only Abhinandan who could fire away the close-range R-73 missile as he managed to sneak in close to the enemy fighter formation after taking off from Srinagar.



This key capability is still missing, though the arrival of the Rafale jets armed with Meteor air-to-air missiles will change the equation. "As per the current scenario, when we plan an engagement, the ideal situation is two Su-30MKIs against one F-16 for an assured kill.

This is because of better radar and weapon on the F-16. When the Rafale comes in, one fighter jet would be adequate to go up against two F-16s," a senior official who was involved in the Balakot operations told ET. While the fleet of 36 Rafale jets would come with the Meteor, there has been no move yet to order more of the jets since the Balakot strike. Conversations on an additional 36 jets that will cost significantly less than the original order of € 7.6 billion have started but the order is nowhere close to being placed.

<https://economictimes.indiatimes.com/news/defence/decisive-strike-capability-upgrade-for-air-force-still-to-be-achieved/printarticle/74328192.cms>



Thu, 27 Feb 2020

## **Indian Air Force ready to take on any target if needed: Air Chief**

*The Air Chief further said the Rafale fighter jets and S-400 air defence systems will act as game-changers*

Srinagar: Air Force Chief RKS Bhadauria on Wednesday said that IAF is ready to take on any enemy target if needed.

"Whenever the requirement comes, whatever be the target, be it close, deep... whatever target is selected, in response to any Pulwama type of attack by the adversary, we will take on. There is no doubt. We are better placed and we are in a position to take on any target at any depth," he said while speaking to ANI on the first anniversary of Balakot airstrike.

The Air Chief further said the Rafale fighter jets and S-400 air defence systems will act as game-changers.

Highlighting that it is a 4.5 generation aircraft with some aspects of fifth-generation, the IAF Chief said: "Rafale is a total game-changer. When we will use it along with the other aircraft we have in our inventory suitably integrated, then we would be a different air force."

On the S-400, the Air Chief said, "S-400 again is a game-changer in terms of the surface to air systems. Once deployed, there would be a total scenario change in terms of how the air battle will be conducted."

*(This story has been published from a wire agency feed without modifications to the text. Only the headline has been changed.)*

<https://www.livemint.com/news/india/indian-air-force-ready-to-take-on-any-target-if-needed-air-chief-11582723109306.html>

# Here's why IAF preferred older mirage-2000 jets over advanced Sukhoi Su-30MKI for Balakot strikes

*It goes without saying that the Indian Air Force deliberately chose the Mirage-2000 over Sukhoi Su-30MKI after careful considerations. Here are the reasons*

*By Ajit Garg*

Beating everyone's expectations, on the early hours of February 26, 2019, twelve Indian Air Force's Mirage-2000 fighter jets crossed the Indian Airspace for the first time to strike the Jaish-e-Mohammed terror launch pads across the Line of Control. The unprecedented cross-border strike, which targeted the biggest JeM hideout in Balakot in a counter-terrorism operation was a retaliation to avenge the Pulwama attack on the CRPF convoy killing multiple troops on February 14 in Pulwama, J&K.

The Mirage-2000 fighter jets are made by Dassault Aviation, the French company who also manufactures the Rafale Medium Multi-Role Combat Aircrafts that are now inducted in the IAF as the fifth-gen multi-role combat jets. The Mirage-2000 dropped 1,000-kg laser-guided bombs.

More than crossing the border itself, everyone was surprised at was the IAF's decision to use the third-gen fighter jet Mirage-2000 rather than more advanced Sukhoi Su-30MKI. It goes without saying that the Indian Air Force deliberately chose the Mirage-2000 over Sukhoi Su-30MKI after careful considerations. Here are the reasons:



## **Proven Capability**

The Mirage-2000 was extensively used during the Kargil war 1999 and turned the tide in favour of the Indian armed forces thanks to India's superior air dominance over Pakistan. However, in 1999, Mirage-2000 never crossed the border.

## **Radar Signature**

Since IAF had to send fighter jets across the border, it was obvious that enemy radar could detect any movement. To reduce detection on enemy radars, IAF chose the Mirage-2000 fighter jets instead of Sukhoi Su-30MKI, which has a very large radar cross-section.

## **Spice-2000**

The Israeli-sourced Spice-2000 system is an advanced laser-guided system that can convert any bomb into a GPS enabled missile that can hit the enemy target from a distance, without actually going near it. At the time of Balakot strikes, only the bombs that can be fitted in Mirage were equipped with Spice-2000, a big reason why the Mirage-2000 was chosen over these two aircrafts.

## **Technology**

Although Mirage-2000 has slowly started to become obsolete now, and is only a third-gen fighter plane, IAF has upgraded it heavily over the years by doing periodic upgradation. It has necessary avionics and technology like a fly-by-wire flight control system and has a Sextant VE-130 HUD, which displays data related to flight control. It carries a Thomson-CSF RDY (Radar Doppler Multi-target) radar on board.



## Flying Power

The Mirage-2000 is a capable and very fast fighter jet. The majority of the Mirage 2000 is powered by the SNECMA M53-P2 engine and has a total takeoff weight of 17000 kg. The Mirage 2000 has a maximum speed of Mach 2.2 (2336 kmph) and can travel 1550 km with drop tanks. The flight height is capped at 59000 ft (17km).

<https://www.news18.com/news/auto/heres-why-iaf-preferred-older-mirage-2000-jets-over-advanced-sukhoi-su-30mki-for-balakot-strikes-2516313.html>

# The Indian EXPRESS

Thu, 27 Feb 2020

## Explained: What are the MH-60R Naval choppers, AH-64E Apaches India has bought?

*The incoming 24 multirole MH-60 Romeo helicopters are expected to boost the Indian Navy's efforts to expand its role in the Indian Ocean Region*

During his speech in Ahmedabad on Monday (February 24), United States President Donald Trump announced: “deals to sell over \$3 billion in the absolute finest, state-of-the-art military helicopters and other equipment to the Indian Armed Forces.”

The following day, after a meeting with Prime Minister Narendra Modi, Trump said that the “agreements for India to purchase... advanced American military equipment, including Apache and MH-60 Romeo helicopters... will enhance our joint defence capabilities as our militaries continue to train and operate side-by-side”.

The India-US Joint Statement issued at the end of the presidential visit noted that “President Trump welcomed India’s recent decision to procure MH-60R naval and AH-64E Apache helicopters”.

Since no major trade deal was announced, these defence purchases by India are the biggest business takeaways from Trump’s visit.

### MH-60 Romeo helicopters

The incoming 24 multirole MH-60 Romeo helicopters are expected to boost the Indian Navy’s efforts to expand its role in the Indian Ocean Region. The Navy had long asked for these helicopters, and the \$2.2 billion deal was cleared by the Cabinet Committee on Security last week.

The MH-60 Romeo Seahawk, made by defence giant Lockheed Martin, is one of the most advanced naval helicopters in the world, used by the US Navy among others. It will be purchased directly from the US government under a Foreign Military Sales (FMS) agreement with the US Department of Defence (DoD).

It is the most capable and mature Anti-Submarine Warfare (ASW) Anti-Surface Warfare (ASuW) multi-mission helicopter available in the world today, the makers say.

The MH-60 is designed to hunt down submarines and will add to the strategic depth and combat capability of the Indian Navy. It is capable of launching Hellfire missiles from the right and left extended pylons.

It also has an advanced system for passive detection, location, and identification of emitters. It can not only track and hunt ships, but is also used by the US Navy as an anti-submarine weapon.



MH-60 Romeo Seahawks have equipped with anti-submarine Mark 54 torpedoes and Hellfire air-to-surface missiles, along with precision-kill rockets.

### **Apache helicopters**

The Army will receive six Apache helicopters that will cost approximately \$800 million.

The six choppers for the Army will be in addition to the 22 Apache helicopters that have already been ordered for the Air Force. This will be a direct commercial sale.

The Apaches can operate at high altitudes, and will be deployed along the Pakistan border. The Army is likely to get the helicopters armed with Stinger air-to-air missiles and Hellfire Longbow air-to-ground missiles.

Among the Apache's modern capabilities are the ability to shoot fire-and-forget anti-tank missiles, air-to-air missiles, rockets, and other munitions. It also has modern electronic warfare capabilities to provide versatility in network-centric aerial warfare.

The choppers are all-weather capable and have high agility and survivability against battle damage. They can be easily maintained in field conditions as well as during operations in the tropical and desert regions.

<https://indianexpress.com/article/explained/explained-what-are-the-mh-60r-naval-choppers-and-ah-64e-apaches-that-india-has-bought-6288005/>

**Bulletin  
of the  
Atomic  
Scientists**

*Thu, 27 Feb 2020*

## **India is building nuclear submarines and ICBMs. That's a \$14 billion mistake.**

*By Frank O' Donnell, Alexander K. Bollfrass*

Despite struggling to modernize outdated conventional forces with the current defense budget, India is investing in two new nuclear platforms. The first is the Arihant-class submarine fleet, the second the mobile Agni-V intercontinental ballistic missile. Together, their combined price tag will top \$14 billion. Is this money well spent?

Pessimism about its strategic balance with China is driving India's nuclear arms procurement. An altercation between troops of both countries in summer 2017, which came to be known colloquially as the Doklam crisis, stimulated introspection among Indian officials and experts about the future of the relationship with China. Politically, the Indian strategic community has largely concluded that the peaceful resolution of border disputes has become less likely, forecasting more rivalry than cooperation.

Indian discussions on the strength of their military position against China in the disputed frontier areas have converged on the view that China holds the conventional and nuclear edge over India in this domain. For example, Jagannath P. Panda, a leading expert on Indian security, observed in a June 2018 conversation that "India's ground force posture and strength is not really comparable to that of China in their border regions. China has better military infrastructure, capabilities, and logistics." A former army commander tasked with defense against China wrote during the 2017 standoff that he expected the episode to end in a barrage of Chinese missile strikes to expel Indian forces from the area

and settle the dispute on Chinese terms. Even India's optimists, a minority, anticipate that China will succeed in staying ahead of India's strategic capabilities.

Despite the hand wringing, India's nuclear and conventional position with respect to both China and Pakistan is in fact robust. India has key under-appreciated conventional advantages on the ground and in the air that assure it against Chinese threats and attacks. Moreover, its nuclear-armed missiles already have sufficient range to credibly hold major Chinese cities at risk.

As a result, India has an opportunity to pursue greater nuclear transparency and restraint with both of its nuclear-armed neighbors. Instead of investing in new nuclear weapons platforms that do little to strengthen deterrence against China, New Delhi should improve the survivability of existing forces and fill the gap in global arms control leadership with an initiative on restraint and transparency.

**Confidence toward Pakistan.** India is rightly confident in its conventional posture toward Pakistan. With recent exercises successfully leveraging air and land power to destroy major Pakistani conventional offensive forces, Indian military officials are now exploring options for standoff strikes against high-value targets deeper into Pakistan.

In the nuclear domain, India's professed goal has always been to field a credible second-strike capability. This assured retaliation doctrine depends on the creation of sufficient doubt in the adversary's calculus that a disarming first strike would succeed by ensuring that Indian nuclear forces are survivable. Survivability relies upon adequate force dispersal.

According to the most recent Nuclear Notebook, India has four types of land-based nuclear-capable missiles. In a forthcoming report, we assess that these missiles are spread throughout the country and provide their likely locations. While their ranges vary substantially, all are capable of reaching Pakistan given their current basing. The four types include approximately 10 Agni-III missiles, which have a range of up to 5,000 kilometers, stationed in Assam in northeast India; around 16 Agni-II missiles, eight of which are stationed in India's northeast and another eight stationed in central India, each with a range of around 2,000 kilometers; about 20 short-range Agni-I missiles; and 24 short-range Prithvi-II missiles stationed close to the Pakistan border.

Beyond this, India also has an estimated two squadrons of Jaguar IS and one squadron of Mirage 2000H fighters, totaling around 51 aircraft, that are tasked with nuclear missions.

Measured by its continuing ability to reach any part of Pakistan from a variety of vectors and existing delivery platforms, India maintains a survivable and credible second-strike posture.

**Nervousness toward China.** In contrast, Indian strategic planners are comparatively insecure in their assessment of the force balance against China. This nervousness, however, is unfounded.

Despite the apparent numerical parity of ground forces on both sides of the border, Indian forces are all permanently close to China's border, shortening their mobilization time and limiting the prospects of a successful Chinese cross-border advance. Even in a war with India, a significant proportion of Chinese ground forces will be unavailable, reserved either for Russian taskings or for countering insurrection in Xinjiang and Tibet. The majority of forces are located further from the Indian border, posing a striking contrast with the majority forward-deployed Indian forces with a single China defense mission.

India also has more and better aircraft along the border, more experienced air crews, as well as a resilient basing position, with "a large number of airfields in the east and west, so even if some airfields are down, operations can continue from other locations." Because of this, Chinese strategic planners intend for early long-range missile strikes against Indian air bases instead of a regional aircraft offensive. However, India benefits from the greater number and redundancy of regional air bases, and the daunting number of Chinese missiles required to truly incapacitate relevant Indian air forces.

Unsurprisingly, the bulk of India's nuclear-armed missile forces are located closer to Pakistan than China. This means that the short-range Agni-I and Prithvi-II missiles are not useful in deterring

Beijing. However, the 10 Agni-III launchers can reach the entire Chinese mainland, while eight Agni-II launchers could reach central Chinese targets.

As for India's nuclear-capable aircraft, these could reach Tibetan airspace equipped with nuclear gravity bombs. However, it is nearly certain they would be identified and intercepted by air defenses before proceeding deeper into China from Tibet.

To bolster its position against China, India is pursuing two new nuclear platforms: the Arihant-class nuclear submarine fleet, armed with 3,500 kilometer range K-4 submarine-launched ballistic missiles, and the Agni-V intercontinental ballistic missile. A principal purpose of these systems is to bring more Chinese east coast metropolises into targeting range.

However, as noted above, India's existing forces already have the necessary range. The 10 Agni-III intermediate-range ballistic missiles stationed in Assam can credibly threaten Beijing, Shanghai, and other high-value Chinese east coast targets. Additionally, the eight Agni-II medium-range ballistic missiles stationed in India's northeast can hold central and western Chinese cities such as Chengdu and Chongqing at risk.

A desire to hold more coastal cities at risk with more warheads misunderstands what deters China. Chinese nuclear expert Wu Riqiang noted in January 2018 that "the fact that India's nuclear weapons can reach Chengdu has the same (deterrence) effect (on China) as being able to reach Beijing." India's posture is sufficient to deter Chinese attack or blackmail without building the Agni-V and Arihant systems, which would serve the same purpose as the Agni-III, but at a higher price.

**Survivability by mobility.** The other objective driving India's acquisition of an at-sea deterrent is its survivability. But building a nuclear-armed submarine is not the only way to improve survivability. A better way to ensure that India could retaliate against a Chinese first strike is by making its existing missile forces more redundant and mobile.

Greater force redundancy can be generated by increasing the number of deployed Agni-III missiles from around 10 to 30. Similarly, deployed Agni-II missiles could move from around 16 toward 20. These latter missiles could also be regularly rotated through India's northwest, center, and northeast, to further improve redundancy and survivability against China. This would improve general redundancy while still fielding a force of sufficient but low numbers.

Another approach would be for Indian protocols to specify that the missiles be dispersed to interior Indian locations and held in protective reserve in peacetime, holding this position even after a Chinese nuclear attack on India's missile bases in its northeast. This arrangement would give India the ability to respond at a time and place of its choosing and would leave Chinese strategic planners considering a strike with no assurance as to whether all Indian nuclear missiles able to reach China had been eliminated. Chinese policymakers would also have to factor in a nuclear attack that included targets deep within India's interior, negating a limited nuclear war scenario that may be available if only targeting bases in India's northeast.

Besides increasing the quantity, India could also augment the mobility of its existing missile forces. Both the Agni-II and Agni-III are road- and rail- mobile, though they reportedly have limited off-road capabilities. Nor are they regularly moved around the country because India "considers substantial dispersal unnecessary, and that it is adequate to move missiles out of their regular garrisons to nearby alternate locations which may also be useful for mating warheads and missiles." This limits their survivability. Improving the land mobility of these forces would thus enhance their survivability, averting the need for a nuclear-armed submarine fleet for survivability reasons. As such, India could bolster its survivable second-strike force at a significantly lower cost to that which is currently planned, and channel the savings into conventional defenses.

Generating dispersal capabilities includes further improving the road and rail network linking these bases and the off-road capabilities of its transporter-erector-launcher fleet. This refocusing of the Indian nuclear posture emphasizing dispersal will ensure that Pakistan and China face greater

uncertainty if considering a nuclear attack against India. The Indian Air Force's existing nuclear missions and number of gravity bombs can remain until this new posture comes to full technical fruition.

These recommended force posture changes for enhanced geographic rotation and dispersal will continue to assure Indian deterrence against China. In contrast, India's current approach of developing new delivery platforms and significantly expanding the force's size brings fewer deterrence benefits and greater risks. These new systems contribute little toward fulfilling India's historical adherence to a minimalist nuclear doctrine, which rejects the presumption that India should build toward numerical parity. Indeed, Indian officials have long rejected the notion of New Delhi pursuing such an arms race.

Instead of bolstering deterrence against China, these new systems may be intended more to project a global power image. A better global investment for India would be in nuclear transparency and stability.

**India's global opportunity.** The decay and collapse of diplomatic arms control restraints are unshackling nuclear weapons capabilities the world over. This presents an opportunity for India to lead a global resistance to this trajectory, bolstered by its strategic sufficiency against Pakistan and China.

The Indian government might begin with unilateral restraints in range and deployment numbers, starting with a pledge not to deploy missiles with a longer range than that of the Agni-III, or about 5,000 kilometers. A voluntarily restrained Indian nuclear force would place India in a strong position to lead global calls for reviving and strengthening arms control talks, including among itself, Pakistan, and China.

Taking upon itself a voluntary leadership role on nuclear restraint would confer additional benefits. First, it would allow India to reassert the credible minimum deterrence nature of its nuclear force, which is increasingly under domestic and international question.

Second, it would place the global spotlight upon China and Pakistan. Despite its larger nuclear arsenal, China claims that its less-caveated no-first-use policy demonstrates that its nuclear practice is closer to nuclear minimalism than that of India. Pakistan, for its part, portrays an ever-worsening Indian nuclear and conventional threat to justify its own nuclear force expansions and doctrinal revisions, which its officials still insist is consistent with a "credible minimum deterrence" posturing concept.

Third, it would free budgetary room for Indian conventional military modernization to maintain its qualitative and quantitative edge against China, and to invest in the connectivity and off-road dispersal capabilities to strengthen Indian nuclear deterrence.

Finally, as India seeks to join both the UN Security Council and the Nuclear Suppliers Group as a permanent member, such an initiative would also support its foreign policy goals of strengthening global nonproliferation efforts outside the Nuclear Nonproliferation Treaty, signaling its nuclear restraint, and highlighting its status as a responsible rising power.

While this would be a landmark in nuclear transparency, especially in South Asia, such recommendations for India are not new. Following the 1998 nuclear tests, retired Indian military officials called for numerical force size ceilings to be formally adopted. Two decades later, it is time to take their advice seriously.

*(Frank O'Donnell's views expressed here are his alone and do not necessarily represent the views of the US Department of Defense or its components. In addition, this report solely utilizes data O'Donnell collated and analyzed from open sources before he joined the US Naval War College.)*

<https://thebulletin.org/2020/02/india-is-building-nuclear-submarines-and-icbms-thats-a-14-billion-mistake/>

## India-UK joint IAF & RAF Exercise Indradhanush 2020 begins at Air Force Stn Hindan

New Delhi: The Indian Air Force (IAF) and Royal Air Force (RAF) of the UK jointly commenced the 5th edition of Exercise Indradhanush at Air Force Station Hindan on 24 February. The focus of this edition of the exercise is 'Base Defence and Force Protection'. The Ministry of Defence (MoD) stated in a Press communication that this theme is of significance considering the recent threats to military establishments from terror elements. Exercise Indradhanush provides a platform for the IAF and RAF to share and jointly validate strategies and tactics to counter terror threats to their installations.

The RAF team comprises of 36 specialised combatants of the RAF Regiment while the IAF will comprise of 42 combatants of the Garud Commando Force, the special forces unit of the Indian Air Force. Both teams will execute missions based on jointly worked out plans and scenarios. Both sides will also exercise specialised weapons, equipment, and vehicles, and validate joint employability.

Special missions will encompass airfield seizure, base defence and anti-terror operations in urban built up zones. These exercises will include para drops from C-130J aircraft, tactical insertions by Mi-17 V5 helicopters, and use of various airborne sensors.

The IAF as well as the RAF are expected to gain significantly from each other's operational experience, training philosophies, contemporary technologies, and best practices followed. Social, sports, and cultural events have been interspersed during the exercise to enhance bonhomie and mutual understanding. The Exercise will conclude on 29 Feb.

<https://indusdictum.com/2020/02/26/india-uk-joint-iaf-raf-exercise-indradhanush-2020-begins-at-air-force-stn-hindan-2/>

