

# समाचार पत्रों से चयित अंश Newspapers Clippings

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## In a first, India figures on arms exporters list

*The latest data on global arms transfer by SIPRI shows that Indian imports have come down since 2015*

*By Many Pubby*

New Delhi: In a first, India has figured on a list of global arms exporters, making a modest entry at number 23 but the ranking is likely to rise sharply over the coming years with the government's focus on encouraging weapons sales abroad.



The latest data on global arms transfer by SIPRI shows that Indian arms imports have come down significantly (by 32%) since 2015, indicating that the 'Make in India' initiative is gaining ground but the country is still ranked as the world's second biggest weapons buyers, just behind Saudi Arabia.

Interestingly, imports from the US have taken a huge dip in the past five years, with the data showing that Russia now accounts for 56% of arms supplies. In fact, the US no longer figures among the top three suppliers of arms to India. After Russia, Israel at 14% and France at 12% are the major sources of weapons for India.

Even though India has ordered systems like the Apache and Chinook helicopters and additional P8I maritime aircraft from the US, orders to Russia – from the S 400 anti-air system to additional T 90 Tanks & helicopters have been significantly higher. The recent \$3 billion deal for Apache and MH 60 'Romeo' choppers has not been taken into account in the data set.

“The USA became the second-largest arms supplier to India in 2010–14 as the security relationship between the two countries developed into a strategic partnership. However, in 2015–19 India continued with its policy of supplier diversification, and imports of arms from the USA were 51% lower than in 2010–14,” the report says.

The silver lining for India, along with the 32% dip in imports has been the entry into the exporters list. At present, the exports shown are modest – they account for only 0.2% of the global arms market – but the start is significant. India's biggest clients are Myanmar, which accounts for 46% of exports, Sri Lanka at 25% and Mauritius at 14%.

As reported by ET, India has a target to increase its defence exports to \$ 5 billion within five years. Defence Minister Rajnath Singh also shared at the ET Global Business Summit that the government will be extending additional Lines of Credit and grants for friendly foreign countries over the next five years.

The SIPRI data also shows the Pakistan has not become completely dependent on China for its weapon systems. Since 2015, China accounts for 73% of arms imports by Pakistan.

<https://economictimes.indiatimes.com/news/defence/in-a-first-india-figures-on-arms-exporters-list/articleshow/74557571.cms>



Tue, 10 March 2020

## **India was 2nd largest arms importer in 2015-19, Russia's share of Indian arms market declined**

*Saudi Arabia, India and China were also among the top five importers during 2010-14.*

*During 2015-19, Pakistan was ranked the 11th largest arms importer in the world*

New Delhi: India retained its position as the world's second largest arms importers during 2015-19, with Russia remaining the largest supplier even though its share of Indian weapons purchases declined from 72% to 56%, according to a leading think tank that tracks arms transfers.

The Stockholm International Peace Research Institute (SIPRI) said in its annual "Trends in international arms transfers 2019" report, released on Monday, the five largest arms importers during the five-year period were Saudi Arabia, India, Egypt, Australia and China, which together accounted for 36% of all arms imports.

Saudi Arabia, India and China were also among the top five importers during 2010-14. During 2015-19, Pakistan was ranked the 11th largest arms importer in the world.

India has been in the second place, behind Saudi Arabia, in SIPRI's list of arms importers for several years as it has moved in recent years to modernise its armed forces by acquiring combat jets, helicopters, submarines, warships, artillery guns and assault rifles from sources such as Russia, the US, France and Israel.

According to data from SIPRI for the period 2015-19, India also acquired military hardware from other countries, including Scanter-6000 radars from Denmark, Embraer ERJ-145 jets for a home-grown airborne early warning and control system, ACTAS sonar systems from Germany, Super Rapid 76mm naval guns from Italy and K-9 Thunder 155mm artillery guns from South Korea.

The report listed India in the 23rd slot among the world's 25 largest arms exporters, with its main clients being Myanmar, Sri Lanka and Mauritius.

The report said India's arms imports from both Russia and the US fell during the five-year period, though the decline was more pronounced in the case of Russian arms deals. India accounted for 25% of total Russian arms exports.

"Russia was the largest supplier to India in 2010-14 and 2015-19, but deliveries fell by 47 per cent and its share of total Indian arms imports went from 72 to 56 per cent," it said. Russian arms exports accounted for 21% of total exports during 2015-19 but were 18% lower than in 2010-14.

The US emerged as India's second-largest arms supplier during 2010-14 as security ties between the two sides developed into a strategic partnership. "However, in 2015-19 India continued with its policy of supplier diversification, and imports of arms from the USA were 51 per cent lower than in 2010-14," the report said.

In contrast, arms imports from Israel and France increased, by 175% and 715% respectively, making them the second- and third-largest suppliers during 2015-19.

Total US arms exports to Asia were down by 20% when compared to 2010-14 as a result of decreases in exports to India (-51%), Pakistan (-92%), Singapore (-60%), South Korea (-34%) and Taiwan (-38%).

Between 2010-14 and 2015-19, arms imports by India and Pakistan decreased by 32% and 39% respectively. “While both countries have long-standing aims to produce their own major arms, they remain largely dependent on imports and have substantial outstanding orders and plans for imports of all types of major arms,” the report said.

China accounted for 51% of Pakistan’s arm imports during 2010-14 and 73% during 2015-19. The overall decrease in Pakistan’s arms imports was linked to the US decision to stop military aid to Pakistan in 2018. The US accounted for 30% of Pakistan’s arms imports during 2010-14 but for only 4.1% during 2015–19.

Pakistan also strengthened its arms import relations with Turkey, with orders for 30 combat helicopters and four frigates in 2018.

The report also noted that India and Pakistan had used imported weapons in clashes following the 2019 suicide attack in Pulwama by the Jaish-e-Mohammed that killed 40 troopers.

“Pakistan reportedly used combat aircraft imported from China, equipped with Russian engines, and combat aircraft from the USA supported by airborne early warning and control aircraft from Sweden. India reportedly used combat aircraft imported from France and Russia, guided bombs from Israel and artillery from Sweden,” it said.

<https://www.hindustantimes.com/india-news/india-was-2nd-largest-arms-importer-in-2015-19-russia-s-share-of-indian-arms-market-declined/story-kHLuqLCHrOppKHkjb5ofsI.html>



*Wed, 11 March 2020*

## **Lieutenant General KJS Dhillon to head defence intelligence agency under CDS Rawat-led department of military affairs**

Lieutenant General KJS Dhillon, who was the commander of the Srinagar-based 15 Corps till recently, has been appointed as the director general of the Defence Intelligence Agency (DIA), and Deputy Chief of Integrated Staff (Intelligence) under the Chief of Defence Staff (CDS) General Bipin Rawat in the Ministry of Defence’s Department of Military Affairs, reports *The Tribune*.

The DIA, which was created in 2002, is responsible for providing and coordinating military intelligence for the Indian Armed forces. The agency was created after the recommendation from a Group of Ministers which looked into lapses leading to the Kargil intrusion in 1999.

The DIA also forms part of the Multi Agency Centre, an umbrella of organisations which looks into infiltration of terrorists from Pakistan and Pakistan-occupied Kashmir.



Lt Gen Dhillon took over the command of the 15 corps in February after the Pulwama attack last year, in which 40 CRPF personnel were martyred. The perpetrators of the ghastly terror attack were killed within 100 hours of the incident.

The 57-year-old Lt General Dhillon, who is from the 1983 batch of the Indian Army, also handled the situation in the Valley after the Centre's decision to abrogate Article 370 of the Constitution, which gave special status to the erstwhile state of Jammu and Kashmir.

He handed over the charge of the 15 corps to Lt General B S Raju on 29 February. He will reportedly assume the charge in the DMA soon as the order for his appointment has been issued.

<https://swarajyamag.com/insta/lieutenant-general-kjs-dhillon-to-head-defence-intelligence-agency-under-cds-rawat-led-department-of-military-affairs>



**DEFENCE AVIATION POST**  
Your Connect To The World Of Defence And Aviation

*Wed, 11 March 2020*

## **INS Vikramaditya: India's protracted carrier challenges**

Successful Landing of TEJAS, the indigenously fighter designed and developed has made a successful external link arrested landing on the India's biggest warship INS Vikramaditya on January 11. "With this feat, the indigenously developed niche technologies specific to deck based fighter operations have been proven," Indian Navy Spokesperson Vivek Madhwal told IANS.

This will now pave the way to develop and manufacture the twin engine deck based fighter for the Indian Navy, he said. The Navy has created an aircraft carrier setting on the ground at its air base in Goa to operate these deck-based fighters, which use ski jump to take off and are recovered by arrestor wires on a carrier or STOBAR (short take-off but arrested recovery) in Navy parlance.

### **India's New Carrier – INS Vikramaditya**

India faced 2 major challenges. One was slipping timelines, which risked leaving them with no aircraft carriers at all. The other challenge involved Vikramaditya's 3-fold cost increase, as Russia demanded a re-negotiated contract once India was deeper into the commitment trap. The carrier purchase has now become the subject of high level diplomacy, involving a shipyard that can't even execute on commercial contracts. A revised deal was finally signed in March 2010, even as deliveries of India's new MiG-29K naval fighters got underway – but now Russia still has to make good.

### **INS Vikramaditya Trials**

Russian naval doctrine saw the 45,000t Admiral Gorshkov as a missile cruiser with a complement of aircraft. India wanted a full-fledged aircraft carrier. Getting there required extensive modifications.

The cruiser-carrier's guns, anti-shipping and air defence missile launchers on the front deck were removed. In their place, India installed a full runway and ski jump, widened the deck in numerous places, and installed a bigger and stronger rear aircraft elevator.

<https://www.defenceaviationpost.com/2020/03/ins-vikramaditya-indias-protracted-carrier-challenges/>



Tue, 10 March 2020

## **India's approach to the Indian ocean region: from sea control to sea denial**

*Given the budget constraints, the Indian Navy's approach should change from sea control to sea denial*

*By Suyash Desai*

India's Chief of Defence Staff General Bipin Rawat announced last month that India will prioritize submarines over its third aircraft carrier. The importance of this announcement was lost amid the clutter surrounding U.S. President Donald Trump's visit to India. "When we know that there would be two aircraft carriers there, and if the submarine force is dwindling, then our priority should be for submarines," said General Rawat. It is a notable statement coming from the CDS himself, possibly hinting at the much-needed change of approach from sea control to sea denial towards the Indian Ocean Region (IOR).

The Indian Navy believes in a strategy of sea-control, meaning "the ability to use the sea in reasonable safety." The Indian naval doctrine defines sea control as a capability to use a defined sea area, for a defined period, for a defined purpose, and simultaneously deny the sea to the enemy. The document itself says that any control per force would be limited to space and time, and doesn't guarantee protection from an enemy attack. Sea control is exercised using a combination of capital-intensive ships, fixed-wing aircraft, helicopters and amphibious capabilities. It is an expensive affair and requires sustained modernization.

In contrast, a sea denial strategy means denying the adversary use of a sea area for a certain duration. It is a part of sea control and could be used offensively to lower adversary's war-waging capabilities by limiting its freedom to navigate. Submarines combined with surface ships, helicopters and surface-to-surface missiles are optimal tools for exercising sea denial.

### **China's Rise**

China's 2015 defense white paper called for a change of approach from near seas defense to far seas protection. China is dependent on the Sea Lanes of Communications (SLOC) for its energy imports and trade flow which passes through the IOR. Hence, the securing IOR features prominently in its China's core objectives. To protect its interest overseas, it is already commissioning more long-ranged vessels and strategic aircraft. It established an oversea military outpost at Djibouti in 2017. More such outposts could emerge in Pakistan, Cambodia and Myanmar in the future. China and Pakistan have recently conducted the sixth edition of 'the Sea Guardians' naval exercises in the Arabian Sea in January 2020.

In December 2019, the Chinese research ship, *Shiyan-1*, was caught operating in the waters around Port Blair until the Indian navy expelled it. Naval exercises and the research activities are means to familiarize the navies with the oceanic geographies. Beijing's heightened presence, even during peacetime, may prompt some countries that had been friendly toward New Delhi to shift their allegiances. China's increasing economic and military collaborations and activities across the ocean have made this region a hotbed of geopolitical competition. India's interests are directly impacted by China's naval modernization and its increasing footprints in the IOR.

### **India Needs to Priorities**

India's naval modernization has taken a back seat due to shrinking defense budgets. The Navy's share in the budget declined from 18 per cent in 2012 to 13 per cent in 2019-20. Due to the fund crunch, the requirement of 200 ships has been brought down to 175. There is an apparent mismatch

between its ambitions to control the sea and its current capital expenditure. The lack of funds means that India is also underutilizing its strategic tri-service base at Andaman and Nicobar Islands, which overlooks the all-important Malacca Strait.

It is crucial that the navy priorities its acquisition based on the risk assessment of the region. Given the limited funds for modernization, it at least needs to develop sea denying capabilities, which is cost-efficient than developing sea-controlling capabilities. Submarines are one of the most essential tools for sea denial. They are the means to harrying and tiring the enemy. Their stealth capabilities make them hard to detect in the open seas. Currently, India only has 17 submarines located at Mumbai, Visakhapatnam, Kochi, and Port Blair. Looking ahead, it needs to use this opportunity to develop more sea denial tools and underwater stealth vehicles. The CDS's statement should be a good starting point to put India's submarine modernization plans back on track, acquiring more surveillance aircraft and speeding up the process of acquiring multirole choppers for developing sea denying capabilities.

*(Suyash Desai is a research analyst focusing on China at the Takshashila Institution.)*

<https://thediplomat.com/2020/03/indias-approach-to-the-indian-ocean-region-from-sea-control-to-sea-denial/>



*Tue, 10 March 2020*

## **Think 3D to provide expertise and 3D printed spare parts to the Indian Navy**

*A 3D printer will also be installed on a ship*

*By Davide Sher*

The issue of spare parts and replacement parts is a major issue for all defense forces, In particular, Indian 3D printing service provider think3D reports that this has been a major issue plaguing the Indian Navy. Many of the machines present in the Navy are very old and, in most cases, these machines were imported.

This has led to inconsistent and inadequate supply of spare parts, with long delays whenever a part gets damaged and needs to be replaced. Keeping the entire machine idle till the spare parts get replaced is costing Navy a lot. To solve this issue, the Indian Navy finally decided to turn to AM technologies to get the spare parts 3D printed and replaced on demand.

think3D has supplied various 3D printed spare parts to the Indian Navy and these spare parts are successfully tested and incorporated into several machines, in particular, to solve the Navy's long-pending need for quick replacement of the centrifugal pump impellers on board the ships. In this particular case, think3D used 3D scanning to acquire the 3D data and HP's multijet fusion technology 3D print the part.

The settings were thoroughly analyzed and modified to print the part with desired mechanical properties. The part was then CNC machined and a metal bushing was inserted to create an interface between metal rod and plastic component. The part was then successfully tested in the real environment for the desired number of hours.

Now the other major issue being faced by the Indian Navy is parts undergoing damage when the ship is off-shore. In such scenarios, there is no way for the parts to be replaced on-demand. Either the parts are air-lifted to the ship or the ship is brought back to shore for fitting the parts. Both these scenarios are highly undesirable and cost a lot of time and money for the Indian Navy. To solve this major issue, think3D and the Indian Navy together deliberated an approach to have a 3D printer mounted on the ship with the CAD designs of the spare parts pre-loaded into the machine so that the operator can 3D Print the parts on-demand.

Due to the roll and pitch of the ship and constant vibration, operating a 3D printer on-board a ship has a different set of requirements than operating the same machine on-shore. think3D is now closely collaborating with the Indian Navy to develop a custom system to meet this demand.

<https://www.3dprintingmedia.network/3d-printed-spare-parts-indian-navy/>

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Tue, 10 March 2020

## Wavering dominance

*In its role as an arms supplier to South and Southeast Asia, Russia is fast losing traditionally-held ground to the US and China even as India struggles to break into the market*

*By Nantoo Banerjee*

It is interesting to note that the international arms trade in the South and Southeast Asian regions is fast getting narrowed down between two major suppliers, the United States and the People's Republic of China. Russia, traditionally a major player, is steadily losing ground to the two more aggressive arms traders — the US and China. For the US, raising arms exports to India appears to be more important than striking a bilateral trade deal between the two countries. This became amply clear during the recent two-day visit of India by President Donald Trump. At the very beginning of his trip, Trump announced in Ahmedabad that he and Prime Minister Narendra Modi would sign off on a \$3.5 billion arms deal, which would see the sale of 24 Sikorsky MH-60R Sea Hawk multi-role helicopters for the Indian Navy and six Boeing AH-64E Apache Guardian attack helicopters for the Indian Army. However, the two leaders failed to agree to an anticipated general trade deal.

The actual size of the US arms deals with India this year is expected to go up to well over \$5.3 billion if one takes into account the February 7 authorisation of a potential \$1.7 billion sale of IADWS short-range air defence systems to protect the Indian capital region. This is probably the biggest US arms sale commitment to India in a single month. Incidentally, the US recorded a massive growth in its arms exports to India, over 550 per cent in the 2013-17 period compared with the previous five years. The US is India's second-largest arms supplier.



Traditionally, Russia has been the biggest suppliers of weapons to India. But, its dominance is depleting. Russia's arms export to India fell by a whopping 42 per cent between 2009-2013 and 2014-18. Russia accounted for 58 per cent of India's total arms imports in 2014-2018, compared with 76 per cent in 2009-2013, says the Stockholm International Peace Research Institute (SIPRI) report, Trends in International Arms Transfers, 2018. Israel, the US and France all increased their arms exports to India in the 2014-18 period. Russia seems to be losing its arms market in the region, yielding ground mostly to China. Interestingly, China has emerged as the fifth largest arms exporter, with exports rising by 38 per cent between 2008-12 and 2013-17. A majority of these weapons have been procured by countries in India's neighbourhood.

For instance, Pakistan no longer depends on US arms for its military. China now accounts for almost 70 per cent of Pakistan's arms import. China is also helping Pakistan build an arms manufacturing base to supply to other friendly countries in the region. Pakistan's imports from the US dropped by 76 per cent in 2013-17 compared with 2008-12. Thanks to China, Pakistan is emerging as a manufacturer-exporter of arms in Asia. Next to Pakistan, Bangladesh has become a heavy purchaser



of Chinese weapons. Between 2008 and 2018, China provided \$1.93-billion worth weapons to Bangladesh. This constitutes 71.8 per cent of Bangladesh's military acquisitions over this period, making Beijing far and away from the biggest supplier of arms to Dhaka, says SIPRI.

Nearly 70 per cent of China's arms exports went to Asia and Oceania in the last five years. About 20 per cent went to Africa and 6.1 per cent to West Asia. Since 2007, China's top arms export destinations by total units were Pakistan (6.57 billion units), Bangladesh (1.99 billion units) and Myanmar (1.28 billion units), reports SIPRI. All three countries are part of China's global development strategy — the Belt and Road Initiative (BRI). Barring India, China is dominating the arms trade in the entire region. China has made massive progress in arms manufacturing and exports while its own arms imports are steadily declining. While India continues to depend on imports for its arms requirements, China's arms imports fell by 19 per cent between 2008-12 and 2013-17. After Beijing joined hands with Islamabad on counter-terrorism initiatives, China's annual arms sales to Pakistan surged to an annual average of around \$700 million. In March 2018, Beijing announced the sale of sophisticated optical tracking systems that could be used for nuclear missiles with multiple warheads. This announcement came just weeks after India successfully tested the Agni-V long-range ballistic missile in mid-January. Other purchases highlight close levels of collaboration between China and Pakistan, such as the jointly-developed JF-17 aircraft and China's ongoing construction of the Type 054AP class warship for the Pakistani Navy.

India has a long way to go before it is capable of manufacturing world-class lethal weapons. The country is, however, doing well in manufacturing and exporting conventional weapons and accessories. India has set a tall export target of \$5 billion worth of military hardware in the next 5 years from the current level of nearly \$1.5 billion. India exports conventional defence equipment and safety gears to some 42 nations, including the US, Australia, Finland, France, Germany, Israel, South Africa, Sweden, Azerbaijan, Seychelles, Estonia, Indonesia, Guinea and the Philippines.

However, India continues to be the world's second-largest importer of major arms accounting for 9.5 per cent of the global total. The country's arms import trend is expected to continue for several years to come even as China expands its strategic arms control in the region. Western arms exporters, led by the US, is out to exploit the situation.

Russia, the world's second-largest arms exporter, seems to be losing out to its rivals, mainly on account of delay in delivery schedules. Interestingly, in the Global Firepower List 2018, third-ranked China sharply led India in terms of active military personnel with its 21.83 lakh personnel as against India's 13.62 lakh. India's military ranks fourth on a global index of 136 countries, based on their military capabilities, only behind the US, Russia and China.

*(Views expressed are strictly personal)*

<http://www.millenniumpost.in/opinion/wavering-dominance-404712?infinitescroll=1>



*Tue, 10 March 2020*

## **Guntur woman selected for defence award**

Vijaywada: Gogineni Sujatha, who hails from Guntur district has been selected for the prestigious defence award “Ayudha Bhushan,” the equivalent of Padma Bhushan, for her achievements in the defence manufacturing sector. She will be conferred the award in Kolkata on March 18.

Ms Sujatha did her schooling at Pattibandla Seetharamaiah High School and her Intermediate in JKC College in Guntur. She did her engineering in Bulgaria. She is the daughter of highly respected and popular trade union leader G. Suryam. After returning to India from Bulgaria, she joined the defence manufacturing sector in 1989.

Ever since she has worked in several defence manufacturing and ordinance institutions. Starting her career in New Delhi, she worked in Avadi at Chennai, Kolkata and Medak. She worked in units that manufacture heavy defence vehicles, battle tanks and earned many awards for her contributions. She was however selected for her work with digital systems in the defence IT sector.

<https://www.thehindu.com/news/national/andhra-pradesh/guntur-woman-selected-for-defence-award/article31029058.ece>



Wed, 11 March 2020

## HBL Power Systems bags orders from Railways, Indian Navy

By Mohammed Hussain

Hyderabad: HBL Power Systems said on Tuesday it has bagged orders worth Rs 180 crore which will contribute to the company's growth.

The Indian Navy has placed an order for seven submarine propulsion batteries with a value of Rs 85 crore. The product will be delivered over the next 18 months.

"This is the first time HBL has been recognized as a source for submarine batteries by the Indian Navy and further orders including exports are likely," it said in a statement.

The company will supply train collision avoidance systems worth Rs 70 crore to South Central Railway. The contract is executable over the next 18 months.

"Twelve years of efforts made by the company to pioneer development of this safety-critical technology indigenously have come to fruition," HBL said adding that further orders in this category are expected regularly.

Besides, HBL has received export orders of over Rs 26 crore for the supply of lithium thermal batteries. These orders are from new customers and are expected to result in continued long-term business, it said.

<https://www.siasat.com/hbl-power-systems-bags-orders-railways-indian-navy-1851463/>



Tue, 10 March 2020

## US envoy sees potential to boost US-India defence ties, Consular capabilities

*Visits Tata-Lockheed Martin Aero structures facility, New Consulate Compound in Hyderabad*

Hyderabad: US Ambassador to India, Kenneth I Juster, sees potential to advance India-US defence engagements and strategic partnerships.

During his visit to Hyderabad, he toured the Tata-Lockheed Martin Aerostructures facility, which stands as a testament to the strong relationship between the defence industries of the US and India.

Ambassador Juster's visit to the 4,700-sq m facility marks the 10-year anniversary of this partnership and highlights the importance of the growing defence ties between the two nations.

The jointly-owned facility in Adibatla manufactures airframe components, including centre wing boxes and tail sections for the C-130J military transport aircraft.

Tata-Lockheed plans to expand the partnership to produce aircraft in India, which would advance the capabilities of the Indian Air Force and boost US-India cooperation in high-end technologies.

### **New Consulate Compound**

The Ambassador attended the “Topping Out” ceremony of the New Consulate Compound in Hyderabad and celebrated the completion of all major structural components at the new compound.

The Consulate General Hyderabad officially engages communities, companies, and institutions across the States of Telangana, Andhra Pradesh, and Odisha.

Spread across more than 12 acres, the facility will feature 54 consular interview windows as well as artfully preserved Deccan rock formations.

### **Aid for cultural conservation**

The Ambassador also announced the completion of a US-funded restoration project at the 17th century Qutb Shahi Tombs through the Ambassadors Fund for Cultural Preservation (AFCP).

In February 2019, Ambassador Juster announced a \$103,000 grant through the AFCP, partnering with the Aga Khan Foundation to restore the centuries-old tombs of Taramati and Premamati within the greater Qutb Shahi Tombs complex. This is the second grant awarded by the US Government for conservation work at the Qutb Shahi Tombs.

An earlier AFCP grant of \$101,000, awarded in 2014, contributed to mapping and documenting structures throughout the site and helped deepen archaeologists’ understanding of the monument’s earliest architecture.

Ambassador Juster said, “I’m pleased to see progress at the new US Consulate Compound in Hyderabad.” The Ambassador added, “From the success of the US-India defence partnership, as exemplified by a decade of cooperation between Lockheed Martin and Tata, to the restoration of the historic tombs of Taramati and Premamati, US-India ties are clearly thriving in Hyderabad.”

<https://www.thehindubusinessline.com/economy/us-envoy-sees-potential-to-boost-us-india-defence-ties-consular-capabilities/article31030750.ece#>

## **THE ECONOMIC TIMES**

*Tue, 10 March 2020*

### **How China is rapidly expanding its missile arsenal**

*China fired more than 100 ballistic missiles during testing and exercises in 2019, according to sources close to the US military. Such a figure greatly exceeded what the USA and Russia launched, and it illustrates that China is not decelerating in any way its development of missiles for the PLA Rocket Force (PLARF)*

One of the martial strengths of the People's Liberation Army (PLA) is its missile arsenal, which is advanced and contains a multitude of more than 40 types that can be used to carry either conventional or nuclear warheads. One key type is the DF-26 intermediate-range ballistic missile (IRBM), which is being introduced in greater numbers.

Indeed, China fired more than 100 ballistic missiles during testing and exercises in 2019, according to sources close to the US military. Such a figure greatly exceeded what the USA and Russia launched, and it illustrates that China is not decelerating in any way its development of missiles for the PLA Rocket Force (PLARF).

Most missiles are test-fired in northwest China, where the USA and others have poor radar coverage. The USA must, therefore, use satellites to detect the heat signatures of missile launches.

Among the missiles that China fired last year, a large number were DF-21D medium-range anti-ship ballistic missiles (MRBM) and DF-26 IRBMs. The latter has a range of up to 4,000km and it can reach military targets in Guam when fired from Mainland China. These two missiles illustrate Chinese efforts to keep US and allied warships far from China's coast.

A similar level of launch activity was witnessed in 2019. US Sources noted "China launched more ballistic missiles for testing and training than the rest of the world combined" in 2019.

Part of the reason for Washington's August 2019 withdrawal from the 1987 Intermediate-Range Nuclear Forces Treaty (INF) with Russia is China's proliferation of land-based missiles in the 500-5,500km range, a segment that both Russia and the USA voluntarily gave up. China has gained a distinct advantage in MRBMs and IRBMs because it was not bound by such a treaty.

Quite apart from its range, sufficient to reach Guam and hence its nickname the "Guam killer", the DF-26 is dangerous in that it is dual-capable since it can either a nuclear or high-explosive warhead.

The PLA is believed to have fielded the DF-26 within an operational unit for the first time in 2016, and the latest assessment by US sources on the PLA listed an estimated inventory of 80 DF-26 launchers and up to 160 missiles, whereby each launcher might have one missile reload available.

DF-26 missiles are manufactured at a facility in Fangshan in the western part of Beijing. The same factory also seems to make DF-21 and air defense missiles. The very first DF-26 showed up in satellite imagery there in March 2009. By September 2019, a total of 51 launchers were visible there, of which 38 appeared to be finished and the rest were in various stages of assembly.

The first DF-26 missile unit to be identified was 666 Brigade, which is located in the town of Xinyang in southeastern Henan Province. This unit was formally stood up in April 2018, at which time imagery showed 18 DF-26 TELs. Xinyang is about 3,750km from Guam, compared to 4,350km for Mumbai. DF-26s could thus target locations in India that are closer than this.

The second confirmed DF-26 unit was 624 Brigade located at Qingyuan, just 80km from China's coast in northern Guangdong Province. This brigade was a former DF-21 operator. Qingyuan is believed to be currently hosting 626 Brigade as well, before the latter transfers to a new base being established on Hainan Island. At this point, it is too early to say which of 624 or 626 Brigades will be a DF-26 or a DF-21D unit.

Another assumed DF-26 unit still being developed is 654 Brigade at Dengshahe near Dalian in Liaoning Province. Interestingly, photos of TELs at a field training site near there were circulating as early as January 2018.

Missiles have also appeared at Korla in Xinjiang (with 646 Brigade in April and August 2019), possibly at Jinhua in Anhui Province, and at the Jilantai training area in Inner Mongolia. Satellite imagery confirmed that DF-26s were training there alongside DF-41, DF-31AG and DF-17 missiles in April-May 2019, including actual launches. These TELs later appeared in the Beijing parade on 1 October 2019.

US Sources commented about numerous DF-26 missiles turning up at a training base 9km south of Qingzhou in Shandong Province (coordinates 36.6011°N 118.4818°E) recently.

Sources stated, "This is the first time the DF-26 has been seen operating in the area and marks a new phase in the integration of the missile into the Chinese military." Qingzhou contains a nearby PLARF missile support base, with different missile types appearing there over the years.

At the above training location, sources spotted a dozen launchers there in November 2019 imagery. December pictures then showed 18 DF-26 launchers plus many support vehicles at this location. Sources predicted, "The DF-26 launchers are probably at the site as part of their integration into a new brigade."

If there are 18 launchers in each DF-26 brigade, the estimate of 80 TELs could mean enough weapons for up to four brigades, even if not all are operational yet and units are still being equipped. Sources further estimated that 2-3 DF-26 units existed a year ago, with each brigade having 6-12

TELs. Extrapolating, if each DF-26 brigade has 12 or fewer TELs (instead of 18), then this appearance of 18 TELs at Qingzhou could indicate more than one unit was training together.

Sources noted four important points of concern relating to China's multiplication of the DF-26 arsenal. "The first reason is the growing size and diversity of the Chinese nuclear arsenal. China officially maintains what it calls a minimum deterrent focused on ensuring it has a secure retaliatory capability to respond to a nuclear attack." China will soon overtake France with the world's third-largest nuclear arsenal, and its stocks have doubled over the past 15 years. Nonetheless, Beijing is still far behind nuclear weapon numbers in Russia and the USA.

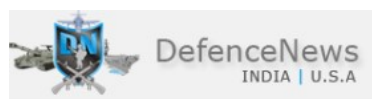
Concerning the angst that Beijing's expansion of its nuclear weapons creates, the sources pointed out: "China's rejection of such concerns as well known but counterproductive, because it will fuel the development and deployment of military capabilities that China will see as growing threats to its national security. The Chinese government could help alleviate concerns and worst-case response by issuing factual statements about the status and future plans for its nuclear arsenal. This would not require disclosing everything, but as a growing military power, the days are over when China could hide behind the larger nuclear powers."

Sources also made a second point is the dual-capable nuclear/conventional nature of the DF-26. "The inability to clearly distinguish the two creates significant challenges for crisis stability and escalation scenarios. In a tense crisis or a war, Chinese readying of conventionally armed DF-26 launchers could easily be misinterpreted as preparations to employ nuclear weapons, and cause an adversary to ready its nuclear weapons unnecessarily and precipitately. If China launched a conventionally armed DF-26, the target country might assume the worst and prematurely escalate to nuclear use."

A third factor is that the DF-26's payload section is guided and is, therefore "capable of near-precision strike capability" against land targets, according to the US Sources. Why is this important? "Retaliatory nuclear deterrence does not require near-precision, but warfighting could. As such, Chinese deployment of highly accurate, quick-strike, dual-capable weapons could further deepen uncertainty and speculations about Chinese nuclear strategy."

China continues to shroud nearly all its missile systems in a bubble of secrecy. It is yet to explain how or when it would use its dual-use DF-26, for instance. Other than that, China's 2019 Defense White Paper listed the aim of enhancing...nuclear deterrence and counterattack [and] strengthening intermediate and long-range precision strike forces". It is doing precisely that with mounting numbers of the DF-26.

<https://economictimes.indiatimes.com/news/defence/how-china-is-rapidly-expanding-its-missile-arsenal/articleshow/74548346.cms>



*Tue, 10 March 2020*

## **This Kerala-based startup is set to launch world's first blockchain-powered satellite**

Blockchain technology, which is being used extensively in safe transactions, data security, and a few other applications, is now being deployed in space. And Accubits, a startup based in Thiruvananthapuram, Kerala, has taken the lead. The developers claim that they are all set to launch the world's first blockchain satellite, called Chainsat.

On the concept of blockchain-powered satellites, Aharsh MS, Chief Marketing Officer, Accubits, tells YourStory, "Chainsat will serve two purposes. One, it will act as one of the nodes of a private

blockchain network or consortium blockchain. Second, it will enable a communication channel between different nodes of the blockchain network.”

The startup aims to send a low earth orbit satellite, weighing 12 kg, to space for establishing an enterprise blockchain ledger that can enable a secure transactional network for next-generation financial and IoT systems. It wishes to send it to the orbit by Q1 2021.

Besides, the startup will develop the software and firmware for the satellite while the hardware part will be collaboratively built by Accubits and a vendor. For this, the startup is in talks with multiple firms for collaboration.

#### **One-of-its-kind solution :**

Not all businesses are established in well-connected areas like Tier-I or Tier-II cities, but are set up across Tier-III cities. Today, companies have sprung in remote areas as well with dire connectivity issues.

Here, Chainsat will enable a secure communication channel for enterprises to use a blockchain network. According to Aharsh, Chainsat will enable businesses across the world to meet the specific requirements, as it acts as a blockchain node, or a point of contact for the enterprises.

For instance, for agro-related businesses, the production farms are remotely located and most of these places do not have internet accessibility. Here, Chainsat can help in establishing communication to access a blockchain ledger for applications like supply chain traceability and other crucial operations.

Besides, the satellites will be no different from the rest in the orbit in terms of its orbital presence, launch and operation. What differs is the software architecture and the internal hardware that is designed to host a blockchain node.

<https://www.defencenews.in/article/This-Kerala-based-startup-is-set-to-launch-world%e2%80%99s-first-blockchain-powered-satellite-809646>



*Tue, 10 March 2020*

## **ISRO: Harnessing space tech for public good**

*With an emphasis on ‘frugal innovation’, the space agency, which has written its name in the stars, touches hundreds of millions of lives every day*

*By M Somasekhar*

Think of Indians in various walks of life: a fisherman setting out to sea hoping for a good catch; a soldier in remote Siachen in urgent need of medical assistance; a farmer for whom accurate monsoon forecasts are the difference between a bountiful crop and a dismal one; and students in rural India, with lessons beamed into their classroom.

All these disparate characters are connected by the cosmic thread of an Indian scientific organisation that is reaching for the stars, quite literally, and touches the lives of hundreds of millions of Indians every single day.

That agency, the Indian Space Research Organisation (ISRO), the BusinessLine Changemaker of the Year – 2020, has burst into the exclusive club of international space research organisations, on the strength of its frugal innovation and indigenous science capability.

Indicatively, fisherfolk benefit from bulletins on Prospective Fishing Zones (PFZs), put out by the Indian National Coastal Information System (INCOS), which harnesses space technology to identify fish-rich zones where fishermen stand the best chance of netting a good catch. People in areas under-

served by medical infrastructure — including rural areas (and Siachen!) — benefit from ISRO's Tele-medicine programme, which started in 2001. Farmers profit from ISRO's remote sensing satellite data on monsoon prospects and water availability. And students in rural areas expand their academic horizons through ISRO's Tele-education networks, which facilitate TV broadcasts, video conferencing, and web-based instruction.

That's not all. Even ATM and stock market operations derive benefits from ISRO's space tech. Without risk of exaggeration, it is hard to visualise any area of activity that ISRO does not touch.

### **Then and Now**

India's tryst with space began in the 1960s. An iconic image from 1966 of a rocket cone being carted on a bicycle at the Thumba Equatorial Rocket Launching Station in Thiruvananthapuram — and an equally striking one of a satellite payload being carried on a bullock cart in 1981 — bear testimony to ISRO's austere origins.

Fast forward to 2017, when ISRO's Polar Satellite Launch Vehicle (PSLV) launched a record 104 satellites in one go, and the space agency's giant leap in just half a century becomes self-evident.

From Aryabhata, the experimental satellite launched in 1975, to Project Gaganyaan, which is gearing up to send Indians to space in 2022 to mark the 75th year of India's independence, the hallmark of India's space programme has been its low cost, frugal innovation, industry participation, and very high societal benefits.

Along the way, ISRO, which drives the programmes, has reached the moon, through Mission Chandrayaan; Mars via the Mars Orbiter Mission (MOM); put a cluster of navigational satellites in orbit; built launch vehicles such as the Geosynchronous Satellite Launch Vehicle (GSLV), which can place over 4.5 tonnes of payload into Geosynchronous Transfer Orbit. It is now aiming for the sun.

It has not always been an easy ride, though. Failures have been the stepping stones to success for the untiring and motivated ISRO scientists. Right from Aryabhata to SLV-3 and from GSLV to the latest Chandrayaan-2, the agency has faced many setbacks. But each time, it has bounced back.

### **Frugal Innovation is the Key**

A defining characteristic of ISRO's success is that all of its technology and materials are uniquely indigenous. "Our USP is our cost-effectiveness," says ISRO Chairperson Kailasavadivoo Sivan.

Over 50 years, ISRO has realised the vision of Vikram Sarabhai and the founding leaders by improving the safety, security and quality of life of every Indian. "Our job now is to sustain this momentum in technology development, applications and achieve greater heights," says Sivan.

The coming decade promises to be an intense one for ISRO. In addition to the Gaganyaan project, it is looking to dramatically improve its launch capabilities through the GSLV; build and place into orbit advanced satellites; and move into interplanetary missions, says Sivan.

ISRO's budget runs to barely \$1 billion a year, which is a shoestring compared to developed nations, but it has maximised value from this with a variety of societal applications of its technology.

In 1983, ISRO took the help of European commercial launch service provider ArianeSpace to launch INSAT (Indian National Satellite) from France's Kourou Island. It opened up a world of communication options for India.

In the late 1980s, ISRO again depended on Arianespace to launch the Indian National Remote Sensing Satellite (INRSS). Remote sensing paved the way for mapping out large areas of the country and generation of data that can be harnessed in various spheres.

Decades later, in 2013, it surprised the world with its ₹450-crore Mangalyaan project, sending the MOM at a fraction of the cost that international agencies command for the service. That probe had a life expectancy of just over a year, but it is still orbiting the Red Planet.

Into the 2020s, the space agency is gearing up for more big missions: Chandrayaan-3 in early 2021; the Aditya mission to the sun, also by early 2021; and Mangalyaan-2 by 2023, says Sivan. It is also firming up a mission to Venus.

At the application level, ISRO has a hectic satellite launch schedule — its own and on contract — from the Satish Dhawan space port in Sriharikota, Andhra Pradesh. Cartosat, Risat, and GSAT will expand coverage of the earth and the oceans.

### **Catalysing Space Entrepreneurship**

While developing cutting-edge technologies and harnessing ‘frugal innovation’, ISRO has given a platform for entrepreneurs and private partnerships, and has built networks with institutions through technology transfer or as suppliers of crucial systems in the programmes. In this way, it has helped develop sound infrastructure, capabilities and a reliable ecosystem.

More than 500 industries are involved in the development of launch vehicles and satellites. Over 90 per cent of the launch vehicle cost is accounted for by indigenised technology and materials. The PSLV is highly cost-competitive in the lucrative commercial launch market. So much so that the domestic industry has matured and is now venturing into building satellites.

### **Space and Society**

The Indian space programme had its grounding in applications to society right from the beginning. Among the first of these was the Indo-US Satellite Instrumental Television Experiment (SITE) programme of 1975-76.

The PFZ bulletins for fisherfolk, developed in the early 1990s, offer arguably the most visible impact of space technology on communities. The information on fish-rich shoals helps fishermen save ₹15,000-20,000 crore a year as they do not have to spend on fuel in search of a catch.

In recent years, fishing boats have even been fitted with a gadget that transmits messages about PFZs in the local languages. Videos on the mobile phone app additionally help the fishermen navigate to the fishing zones. India’s space technology has focussed on making rapid development in communication, broadcasting, tele-medicine and education, says former ISRO Chairman AS Kiran Kumar. The real fillip for large-scale applications began in 1983, with the launch of the INSAT series of geostationary satellites. The INSAT series’ purpose was to boost telecommunications, meteorology, broadcasting and search-and-rescue operations.

To get a measure of the impact, remember that in the 1980s, TV broadcasting was confined to just Doordarshan; the service was only in black and white. Colour transmission began in 1982, with the Asian Games in New Delhi. INSAT, with the availability of more transponders of the Ku and S band, increased the range of television offerings — and triggered the birth of the television entertainment industry. Direct to home (DTH) television became real. With the availability of high bandwidth and satellite links, television programmes reached remote corners, including the North-Eastern States and Andaman & Nicobar Islands. Three decades on, television has virtually reached every home, with channels in all languages.

### **Accurate Weather Forecasts**

Thanks to ISRO, weather reporting, cyclone warning and disaster mitigation have undergone a sea change. Given the impetus provided by INSAT and earth observation satellites, the India Meteorological Department (IMD) has refined its monsoon forecast and daily weather bulletins to a high degree of accuracy.

In 1977, in the absence of a warning, more than 10,000 people died, in the cyclone that hit Diviseema in Andhra Pradesh. In 2014, by contrast, when Cyclone Hudhud blew into Andhra Pradesh, fewer than 100 lives were lost, thanks to the early warning, and the precision with which the cyclone path was tracked in real time.



Perhaps the best examples of impactful grassroots application of space technologies relate to the Remote Sensing Satellite programme. Launched in 1988, the INRSS group of earth and resources imaging satellites has generated a wealth of visual data about the country's resources.

Various ministries use these data sets: Project Bhuvan, ISRO's web-based utility portal launched in 2009, gives thematic maps and data on agriculture, water resources, land cover, and so on. It provides a platform for the government to host geospatial data for public consumption. A citizen can get data on everything from cultural sites to highways to disaster management.

The FASAL project (Forecasting Agricultural Output using Space, Afro-Meteorology and Land-based Observation) plays an important contributory role in agriculture operations. Space technology helps authorities get fast and accurate data about the crop situation. It provides digital data, which can be analysed in real time for crop type, area estimates, conditions, damage and growth. The Mahalonobis National Crop Forecast Centre was also established in 2012.

### **Popularising Science**

ISRO also plays an active role in popularising science — and in helping students conjure up audacious dreams of using science for social good. When the Chandrayaan-2 mission got under way, ISRO ran a popular campaign to familiarise students and others with the mission objectives and other interesting insights. It used social media platforms to reach out to larger audiences. That millions of people sat through the night to watch the live launch on July 22 and followed its journey is testimony to the public interest it generated.

In this way, ISRO has rekindled interest in the moon among the youth and has engaged young minds creatively. At another level, it has catalysed a number of start-ups contributing to various aspects of space technology. Small enterprises are building micro satellites and are even contributing mission-critical technology; they have now set their eyes on bigger satellites and even space travel.

From Elon Musk's SpaceX to Jeff Bezos' Blue Origin, with entrepreneurial energy increasingly being channelled in exciting space ventures, ISRO is poised to expand the horizons of human knowledge by flying into newer and unknown spaces of the universe, in order to harness technology to serve humanity.

<https://www.thehindubusinessline.com/blchangemakers/harnessing-space-tech-for-public-good/article31020925.ece>



*Tue, 10 March 2020*

## **India faces big budget cut for new human spaceflight program**

*By Elizabeth Howell*

As India prepares to launch its first astronauts into space, the program will proceed under tighter funding than hoped, at least for the time being.

The human spaceflight program of the Indian Space Research Organisation (ISRO), called Gaganyaan, received only about 30% of the funds sought by the according to the Times of India. ISRO said it will find a way around the low budget, but details were not provided in the news report.

Gaganyaan is designed to send three crew members into space for five to seven days in a small spacecraft, roughly 10 feet by 11 feet (3 meters by 3.4 m) in diameter. Should India achieve its goal of flying its own astronauts, it will be only the fourth country to do so after the United States, the Soviet Union (now Russia) and China.

The 2020-21 budgetary estimate for Gaganyaan is 4,257 crore (about \$639 million), with this figure representing about a third of ISRO's overall budget. The actual amount the agency is allocated so far for human spaceflight, however, is 1,200 crore (\$180.3 million).

While the impact to Gaganyaan is unknown, ISRO has said it will cost about 10,000 crore (\$1.5 billion) to launch Gaganyaan before Aug. 15, 2022, which is Independence Day in India. In general, human spaceflight programs often deal with reduced budgets in one of two ways: by delaying launches or by making cutbacks within the program to allocate the lesser funding received.

India's Parliamentary Committee on Science and Technology, Environment, Forests and Climate Change tabled a report Friday (March 9) asking for more funds bringing ISRO up to its original request, the Times added. But whether that will be implemented is unclear.

ISRO plans to conduct an uncrewed Gaganyaan test mission on its Geosynchronous Satellite Launch Vehicle rocket in December 2020 or early 2021, according to an ISRO report, targeting July 2021 for a second test flight. If all goes to plan under the current schedule, humans would fly in December 2021.

The agency pointed to significant progress in the program in recent times, including the completion of preliminary design reviews (which are typically done just before hardware is finalized). ISRO performed a pad-abort test to qualify its crew escape system in July 2018, among other milestones, the agency said.

"Various technological and infrastructure developments pertaining to crew, human-rated launch vehicle, orbital module, crew safety, reliability and [the] crew escape system are in the process of realization," ISRO said. "[The] overall concept, configuration and interfaces have been firmed up and preliminary design reviews have been completed."

Crew selection and training is also underway under a memorandum of agreement with the Indian Air Force and the Institute of Space Medicine, ISRO added. The first phase of crew selection is completed and once the astronauts are selected, they will be trained at Russian facilities. ISRO also has a contract with Glavkosmos, a Russian launch service provider under its agency Roscosmos, for crew selection, medical examinations and training.

<https://www.space.com/india-human-spaceflight-program-budget.html>