

मार्च

March
2023

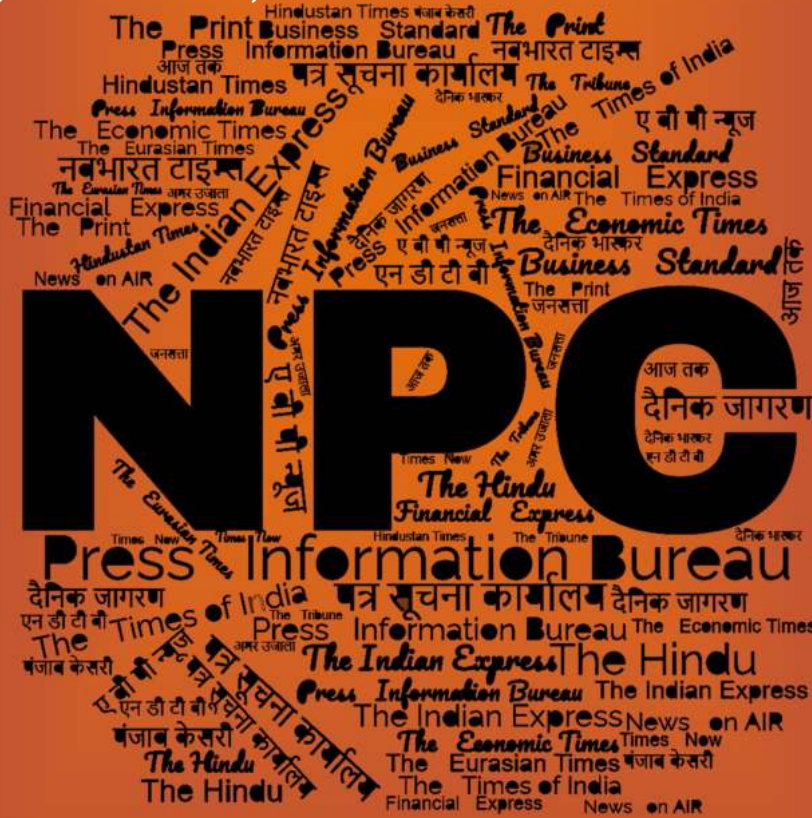
खंड/Vol. : 48 अंक/Issue : 50

14/03/2023

समाचार पत्रों से चयित अंश Newspapers Clippings

डीआरडीओ समुदाय को डीआरडीओ प्रौद्योगिकियों, रक्षा प्रौद्योगिकियों, रक्षा नीतियों, अंतर्राष्ट्रीय संबंधों और विज्ञान एवं प्रौद्योगिकी की नूतन जानकारी से अवगत कराने हेतु दैनिक सेवा

A Daily service to keep DRDO Fraternity abreast with DRDO Technologies, Defence Technologies, Defence Policies, International Relations and Science & Technology



रक्षा विज्ञान पुस्तकालय

Defence Science Library

रक्षा वैज्ञानिक सूचना एवं प्रलेखन केंद्र

Defence Scientific Information & Documentation Centre

मेटकॉफ हाउस, दिल्ली - 110 054

Metcalfe House, Delhi - 110 054

CONTENTS

S. No.	TITLE		Page No.
	DRDO News		1-3
	DRDO Technology News		1-3
1.	Hyderabad Firm with DRDO Labs Develops India's First Quadruped Robot and Exo-skeleton	<i>The Hindu</i>	1
2.	23 DRDO Projects Missed Deadline: Govt.	<i>The Hindu</i>	2
	Defence News		3-15
	Defence Strategic: National/International		3-15
3.	Maritime Partnership Exercise (MPX) with Japanese Maritime Self Defence Force	<i>Press Information Bureau</i>	3
4.	Financial Support to HAL	<i>Press Information Bureau</i>	4
5.	Reduction in Import of Defence Products due to Indigenous Projects	<i>Press Information Bureau</i>	4
6.	India Exported Military Hardware worth Rs 13,399 Crore in Current Fiscal	<i>Business Standard</i>	5
7.	Defence Min Signs Rs 934 Crore Contract for Refit of Sindhukirti Submarine	<i>Business Standard</i>	6
8.	AK-203 Rifles in Manufacturing, Testing Stage: Govt on Korwa Plant	<i>The Economic Times</i>	7
9.	Foreign Vendors Owe Over ₹89 Crore in Three Defence Offset Agreements: Ministry of Defence	<i>Business Line</i>	8
10.	Navy Chief Raises Concern over Growing Geo-political Power Play in Indo-pacific amid US-China Rivalry	<i>The Print</i>	8
11.	Navies of India, Australia, Japan, US, France and UK to Participate in Exercise La Perouse	<i>The Economic Times</i>	9
12.	India Remains World's Largest Arms Importer, with Russia, France & US as the Biggest Suppliers	<i>The Times of India</i>	10
13.	Govt must Look into Safety Issues with Dhruv	<i>The Tribune</i>	12
14.	US Defence Budget Speeds toward \$1 Trillion, keeping China in Mind	<i>Business Standard</i>	13
15.	Japan, Britain, Italy Defence Ministers to Meet in Tokyo this Week	<i>The Times of India</i>	15
	Science & Technology News		16-20
16.	Find Solutions to Problems Affecting Industry and Society, CSIR Director General Tells Scientists	<i>The Hindu</i>	16
17.	CSIR-NIIST Commercialises Technology for Making Agro-Waste Leather Substitutes	<i>United News of India</i>	17
18.	Why a Room-Temperature Superconductor Paper is turning so Many Heads	<i>The Hindu</i>	18

DRDO News

DRDO Technology News

THE HINDU

Mon, 13 Mar 2023

Hyderabad Firm with DRDO Labs Develops India's First Quadruped Robot and Exo-skeleton

Svaya Robotics, a company based in Hyderabad, in association with two DRDO labs — the Research and Development Establishment, Pune (R&DE) and Defence Bio-engineering & Electro Medical Laboratory, Bengaluru, (DEBEL) — has developed India's first quadruped robot and wearable exo-skeleton.



The quadruped robot is for navigating in unstructured terrains to provide remote reconnaissance and inspection for the defence and security forces. | Photo Credit: Arrangement

The company said it has developed the quadruped robot and wearable exo-skeleton as technology demonstrators with design inputs from R&DE and DEBEL respectively. Both are dual-use robots and have multiple use cases in both industry and healthcare, Svaya Robotics said on Monday in a release on the visit of G. Satheesh Reddy, Scientific Adviser to Union Defence

Minister and former chairman of DRDO and senior scientists of the two DRDO labs to its facility here.

Seeking to highlight the significance of 'Make in India', the company said such robots were now being imported by the country from the U.S. and Switzerland. They are made for structured environments with limited capabilities and not suited for deployment in difficult to manoeuvre terrains and field operational conditions that Indian defence and security forces are uniquely faced with, Svaya said.

Expressing happiness at the progress Svaya made, Mr. Reddy said "development partnerships like these are essential to accelerate development of advanced robotics in India and take them into field trials fast and also keep developing them for dual-use in both defence and industry." Robotics would be playing a very important role in enabling Indian defence in both augmenting soldiers and also in providing unmatched remote reconnaissance capabilities, he said.

Svaya said the quadruped robot was indigenously developed in collaboration with DRDO. It is made for navigating in unstructured terrains to provide remote reconnaissance and inspection for the defence and security forces which otherwise are not safe for humans to operate in, founder and MD Vijay R. Seelam said.

The exo-skeleton is being developed by Svaya to suit Indian soldier's anthropometry and augment soldier strength for both walking long distances without fatigue and to lift heavy loads without expending much effort, he said.

<https://www.thehindu.com/news/cities/Hyderabad/hyderabad-firm-with-drdo-labs-develops-indias-first-quadruped-robot-and-exo-skeleton/article66616035.ece>



Mon, 13 Mar 2023

23 DRDO Projects Missed Deadline: Govt.

Twenty-three of the 55 high-priority projects being implemented by the Defence Research and Development Organisation (DRDO) could not meet their respective deadlines, the government informed Parliament on March 13.

The projects included developing anti-air field weapons, surface-to-air missiles, anti-ship missiles, long-range radars, combat vehicles, combat suits for submarines and submarine periscopes, among others.

Minister of State for Defence Ajay Bhatt provided the details in a written reply to a question in the Rajya Sabha.

He said high-priority projects are undertaken at the DRDO under the Mission Mode (MM) project category.

"Currently, there are 55 numbers of ongoing MM (Mission Mode) projects such as anti-air field weapons, solid fuel ducted ramjet technology, surface to air missiles, anti-ship missiles, long range radars, combat vehicles, high endurance autonomous underwater vehicles, combat suits for submarines, submarine periscopes etc.," Bhatt said.

"Of these 55 numbers of ongoing MM projects, 23 numbers did not meet deadlines. Of the 23 numbers of ongoing MM projects which did not meet the deadlines, nine have undergone cost overruns. However, not all cost overruns were necessitated due to time overruns," he added.

The minister, however, did not provide details of the deadlines and period of implementation of the projects.

Replying to a separate question, he said a common communication plan (COMPLAN) for coastal security has been promulgated by the Department of Border Management (BM-II Division) in the Ministry of Home Affairs for coordination among various agencies.

<https://www.thehindu.com/news/national/23-drdo-projects-missed-deadline-govt/article66614990.ece>

Defence News

Defence Strategic : National/International



Press Information Bureau
Government of India

Ministry of Defence

Mon, 13 Mar 2023

Maritime Partnership Exercise (MPX) with Japanese Maritime Self Defence Force

Continuing with the conduct of Maritime Partnership Exercises (MPX) with Friendly Foreign Countries, INS Sahyadri exercised with Japanese Maritime Self Defence Force (JMSDF) ship JS Suzutsuki, an Akizuki Class Destroyer in the Arabian Sea on 11 March 2023.

Aimed at consolidating their shared commitment to regional and global security challenges, the exercise witnessed cross deck landings by integral helicopters, tactical manoeuvres and a customary steampast by the ships. Indian Navy and JMSDF have been collaborating closely on various fronts and playing a key role in ensuring safety of international maritime trade and working towards global commons. The exercise underscored the strong navy-to-navy links and the high level of interoperability between the two nations in the maritime domain.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1906458>



**Press Information Bureau
Government of India**

Ministry of Defence

Mon, 13 Mar 2023

Financial Support to HAL

Hindustan Aeronautics Limited (HAL) had concluded a contract with Government of Mauritius on 17th January, 2022 for export of one Advanced Light Helicopter (ALH) Mk III and associated deliverables. The total contract value is 17.670 million USD (around Rs 141.52 crore). As per the contract, the delivery was to be completed by 18 months, whereas HAL completed delivery ahead of schedule.

The HAL has got adequate infrastructure and experienced manpower in its facility at Bengaluru and also have well-developed ecosystem to execute the export orders in time bound manner. Further, HAL has augmented its infrastructural capability by opening a new facility (HAL Helicopter Factory) at Tumkur, Karnataka.

Subject to strategic considerations, domestically manufactured defence products are being promoted through Lines of Credit/Funding including the platforms/systems from HAL. Government of India also offers indigenously manufactured platforms/systems on grant basis to Friendly Foreign Countries (FFCs) including the platforms/systems from HAL. Defence Attaches have been mandated for handholding of Indian defence companies, including HAL, in execution of their defence contracts. Defence Attaches are also provided with financial support to promote indigenous defence platforms.

This information was given by Raksha Rajya Mantri Shri Ajay Bhatt in a written reply to Shri M Shanmugam in Rajya Sabha today.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1906334>



**Press Information Bureau
Government of India**

Ministry of Defence

Mon, 13 Mar 2023

Reduction in Import of Defence Products due to Indigenous Projects

Many significant projects including 155mm Artillery Gun system 'Dhanush', Light Combat Aircraft 'Tejas', Surface to Air Missile system 'Akash', Main Battle Tank 'Arjun', T-90 Tank, T-72 Tank, Armoured Personnel Carrier 'BMP-II/IK', Su-30 MK1, Cheetah Helicopter, Advanced Light Helicopter, Dornier Do-228, High Mobility Trucks, INS Kalvari, INS Khanderi, INS Chennai, Anti-Submarine Warfare Corvette (ASWC), Arjun Armoured Repair and Recovery Vehicle, Bridge Laying Tank, Bi-Modular Charge System (BMCS) for 155mm

Ammunition, Medium Bullet Proof Vehicle (MBPV), Weapon Locating Radar (WLR), Integrated Air Command and Control System (IACCS), Software Defined Radios (SDR), Lakshya Parachute for Pilotless Target Aircraft, Opto Electronic Sights for Battle Tanks, Water Jet Fast Attack Craft, Inshore Patrol Vessel, Offshore Patrol Vessel, Fast Interceptor Boat, Landing Craft Utility, 25 T Tugs, etc. have been produced in the country during the last few years.

These projects are the result of several policy initiatives and reforms taken by Government in the past few years to encourage indigenous design, development and manufacture of defence equipment, there by promoting self-reliance in defence manufacturing in the country. These initiatives, inter-alia, include according priority to procurement of capital items from domestic sources under Defence Acquisition Procedure (DAP)-2020; Notification of four 'Positive Indigenisation Lists' of total 411 items of Services and three 'Positive Indigenisation Lists' of total 3738 items of Defence Public Sector Undertakings (DPSUs), for which there would be an embargo on the import beyond the timelines indicated against them; Simplification of Industrial licensing process with longer validity period; Liberalisation of Foreign Direct Investment(FDI) policy allowing 74% FDI under automatic route; Simplification of Make Procedure; Launch of Mission DefSpace; Launch of Innovations for Defence Excellence (iDEX) scheme involving start-ups & Micro, Small and Medium Enterprises (MSMEs); Implementation of Public Procurement (Preference to Make in India) Order 2017; Launch of an indigenisation portal namely SRIJAN to facilitate indigenisation by Indian Industry including MSMEs; Reforms in Offset policy with thrust on attracting investment and Transfer of Technology for Defence manufacturing by assigning higher multipliers; and Establishment of two Defence Industrial Corridors, one each in Uttar Pradesh and Tamil Nadu; Opening up of Defence Research & Development (R&D) for industry, start-ups and academia with 25 percent of defence R&D budget; Progressive increase in allocation of Defence Budget of military modernisation for procurement from domestic sources, etc.

These policy initiatives aimed at encouraging indigenous design, development and manufacture of defence equipment in the country, thereby reducing dependency on imports in long run. The expenditure on defence procurement from foreign sources has reduced from 46% of overall expenditure in 2018-19 to 36.7% as per data till December 2022.

This information was given by Raksha Rajya Mantri Shri Ajay Bhatt in a written reply to Shri Vijay Pal Singh Tomar in Rajya Sabha today.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1906335>

Business Standard

Mon, 13 Mar 2023

India Exported Military Hardware worth Rs 13,399 Crore in Current Fiscal

India exported military hardware worth Rs 13,399 crore till March 6 in the current fiscal, a significant increase from just Rs 4,682 crore in 2017-18, according to official data. The details of

the year-wise export of military hardware were provided in the Rajya Sabha by Minister of State for Defence Ajay Bhatt while replying to a question.

Bhatt said the total defence exports in 2021-22 stood at Rs 12,815 crore while it was Rs 8,435 crore in 2020-21, Rs 9,116 crore in 2019-20 and Rs 10,746 crore in 2018-19. The amount in 2017-18 was Rs 4,682 crore.

The minister said the total value of defence exports till March 6 in the current fiscal was Rs 13,399 crore. "The government has given focus on the indigenisation of various defence items to achieve 'Aatmanirbharta' (self-reliance). The indigenised items made from local resources become globally cost competitive and it also facilitates integration of MSMEs in the global supply chain," Bhatt said.

"The new technologies developed by DRDO are transferred to the industries regularly without any fee. Industries have been provided free excess to DRDO patents," he said.

To a separate question, Bhatt said approximately 45,906 acres of defence land under the management of different services and organisations of the Ministry of Defence is presently lying vacant. "Post corporatisation of the Ordnance Factory Board, surplus land of approximately 3,152 acres located at 16 Ordnance Factories has been identified," he said.

Replying to another question, Bhatt said the defence ministry has reduced the restricted zone around the periphery of the defence establishment from 100 metres to 50 metres at various locations. Locations not listed in the communication relating to the restricted distance have been kept unchanged in light of security concerns.

No objection certificate from the local military authority is required for carrying out construction activities within the restricted zone, the minister said.

https://www.business-standard.com/article/economy-policy/india-exported-military-hardware-worth-rs-13-399-crore-in-current-fiscal-123031300956_1.html

Business Standard

Mon, 13 Mar 2023

Defence Min Signs Rs 934 Crore Contract for Refit of Sindhukirti Submarine

The defence ministry signed a contract on Monday for refit of the Sindhukirti submarine at the Hindustan Shipyard Limited at an overall cost of Rs 934 crore.

Sindhukirti is a Kilo-class diesel electric submarine of the Indian Navy.

The Ministry of Defence (MoD) said Sindhukirti will be combat worthy and will join the active submarine fleet of the Navy after the completion of the refit. "In another boost to achieve 'Aatmanirbhar Bharat', Ministry of Defence, on March 13 signed a contract for normal refit of Sindhukirti submarine at Hindustan Shipyard Limited (HSL), Visakhapatnam at an overall cost of Rs 934 crore," it said in a brief statement.

https://www.business-standard.com/article/economy-policy/defence-min-signs-rs-934-crore-contract-for-refit-of-sindhukirti-submarine-123031301040_1.html

AK-203 Rifles in Manufacturing, Testing Stage: Govt on Korwa Plant

Kalashnikov AK-203 rifles for Indian armed forces are currently under manufacturing and testing stage at an Indo-Russian joint venture at Korwa in Uttar Pradesh, the government said on Monday. Minister of State for Defence Ajay Bhatt, in a written reply to a question in Rajya Sabha, said the Indo-Russian Rifles Private Ltd (IRRPL) has established all facilities to commence production of the indigenised assault rifles.

"Indo-Russian Rifles Private Limited (IRRPL) is a joint venture company established for indigenous production of AK-203 Rifles. IRRPL has established all facilities to commence production of indigenised assault rifles at Korwa, Uttar Pradesh," Bhatt said.

"The rifles are currently under manufacturing and testing stage," he said.

Bhatt said indigenisation of AK-203 rifles will lead to self sufficiency in respect of assault rifles for Indian defence forces.

The indigenous defence projects listed by Bhatt included 155mm Artillery Gun system 'Dhanush', Light Combat Aircraft Tejas, surface-to air missile system 'Akash', main battle tank 'Arjun', T-90 tank, T-72 tank, Cheetah helicopter and Advanced Light Helicopter Dornier Do-228.

Bhatt said various policy initiatives to encourage indigenous design, development and manufacture of defence equipment in the country are aimed at reducing dependency on imports in the long run.

"The expenditure on defence procurement from foreign sources has reduced from 46 per cent of overall expenditure in 2018-19 to 36.7 per cent as per data till December, 2022," he said.

Replying to a question on the cost of procurement of Indian Air Force One aeroplanes, he said it cannot be disclosed.

"No information in this matter can be disclosed," Bhatt said.

To a separate question, he said India regularly interacts with friendly foreign countries (FFCs) to enhance defence industrial cooperation.

"The defence industrial cooperation with FFCs aims at development of new technologies, Research & Development, co-development and co-production, promotion of defence exports, establishment of joint-ventures, integration of Indian MSMEs and startups in global supply chain," he said.

<https://economictimes.indiatimes.com/news/defence/ak-203-rifles-in-manufacturing-testing-stage-govt-on-korwa-plant/articleshow/98607456.cms>

Mon, 13 Mar 2023

Foreign Vendors Owe Over ₹89 Crore in Three Defence Offset Agreements: Ministry of Defence

The Centre on Monday informed the Parliament that foreign vendors have not fulfilled three offset agreement obligations worth over ₹89 crore.

The defence policy mandates international players to invest at least 30 percent of the total contract value in the Indian defence industry to discharge offset obligations. In the last five years, 15 offset agreements in the defence sector have been signed.

“Out of the 15 offset agreements, the cumulative percentage of claims fulfilled are 175.48 per cent. However, the specific liability in some of these offset agreements still pending is ₹89.08 crore,” Minister of State for Defence Ajay Bhatt said in a written reply to AAP MP Sanjay Singh’s query in Rajya Sabha.

The total contracted offset amount from 2017 to 2022 in 15 offset agreements with nine foreign vendors is \$1.86 billion, the minister informed the Upper House. While four offset agreements took place in 2017, five in 2018, three in 2019, two in 2020 and one in 2021.

Some foreign defence and aerospace manufacturers, including Safran, Dassault Aviation, Thales (all the three from France), Lockheed Martin (the US), MBDA (European consortium), Rosoboronexport (Russia) and Israel Aerospace Industries have flagged issues related to offset agreements. In May 2022, the minister had informed the Parliament that vendors had either defaulted or non-performed in 21 offset contracts during the last five years, amounting to \$2.24 billion till December 31, 2021. The government had imposed penalties to the tune of \$43.14 million on such vendors in 16 cases, Bhat said. According to the minister, the government had managed to get offset claims worth \$2.64 billion in 47 contracts till December 31, 2021.

<https://www.thehindubusinessline.com/news/national/foreign-vendors-owe-over-89-crore-in-three-defence-offset-agreements-ministry-of-defence/article66615429.ece>

Tue, 14 Mar 2023

Navy Chief Raises Concern over Growing Geo-political Power Play in Indo-pacific amid US-China Rivalry

Navy chief Admiral R Hari Kumar on Monday raised concerns over growing geo-political power play in the Indo-Pacific, noting that the US-China rivalry in the region is likely to be a “marathon.”

In an address at the Vivekananda International Foundation (VIF) at “Vimarsh on National Security Challenges in the Maritime Domain,” he said, “US-China rivalry is here to stay and it

isn't short spin but it will be a long marathon they are engaged in. It has led inevitably to a naval arms race between the West and China similar to the World War-1 era between the allied and the central powers.”

The Navy chief said the US-China rivalry in the region has led to an arms race. “For instance, China has inducted 148 warships in the last 10 years which I would say is perhaps the entire Indian navy size and the process still continues,” he said.

“So this arms race has made our resource-rich region an arena for jostling for influence, markets, resources and energy among others,” added Kumar.

The Navy chief pointed out that the rivalry has led to jostling for space in the region, where many external powers want to come in.

“A large number of countries have come out with their Indo-Pacific strategy and many of them do not belong to the region as well. The Indo-Pacific as a geostrategic reality is also accompanied by the return of great power competition,” he said.

“The simultaneous competition and cooperation accentuate the complexities of security. While much has been said about the ongoing conflict in Europe, the fact is that despite extensive sanctions by the West on Russia most of Europe continues to receive Russian energy which underscores that even during conflicts, it is unlikely that states can be completely devoid of mutual dependencies,” added Kumar.

He also highlighted the significant achievement made by the country in the construction of the ‘Made in India’ INS Vikrant aircraft carrier, saying it had a very high percentage of indigenous equipment including steel which the Defence Research and Development Organisation (DRDO) and local steel companies have developed.

“I feel the maritime character of our nation is now shaping our overall outlook and is probably gaining the recognition that it deserves. The interplay between maritime security and India’s prosperity is becoming probably more clear to the polity, policymakers and the people of India. Thus maritime India is on the rise and the tides of time demand that we grab this opportunity to sail out in these high waters,” added the Navy Chief.

He also pointed out that out of the 43 warships and submarines being constructed by the Navy, 41 are being made in India only.

<https://theprint.in/world/navy-chief-raises-concern-over-growing-geo-political-power-play-in-indo-pacific-amid-us-china-rivalry/1441512/>

THE ECONOMIC TIMES

Mon, 13 Mar 2023

Navies of India, Australia, Japan, US, France and UK to Participate in Exercise La Perouse

Personnel, ships and integral helicopters of the Royal Australian Navy, French Navy, Indian Navy, Japanese Maritime Self-Defence Force, Royal Navy and the United States Navy will

participate in Exercise La Perouse. The third edition of the multilateral exercise La Perouse will be conducted in the Indian Ocean Region from March 13-14.

The biennial exercise La Perouse is conducted by the French Navy and aims to enhance maritime domain awareness and optimise maritime coordination amongst the participating navies in the Indo-Pacific region, the Ministry of Defence said in a press release.

The two-day exercise provides an opportunity for like-minded navies to develop closer links in planning, coordination and information sharing for seamless maritime operations, according to the press release. Exercise La Perouse will include complex and advanced naval operations, including surface warfare, anti-air warfare, air defence exercises, cross-deck landings and tactical manoeuvres.

Indian Navy's indigenously built guided missile frigate INS Sahyadri and fleet tanker INS Jyoti will participate in the third edition of the multilateral exercise, according to the press release. Participation of the Indian Navy in the exercise demonstrates the high levels of synergy, coordination and inter-operability between the friendly navies, and their commitment to a rules-based international order in the Indo-Pacific region.

Earlier, the Indian Navy's indigenously built guided missile frigate, INS Sahyadri participated in a Maritime Partnership Exercise (MPX) with French Navy (FN) ships FS Dixmude, a Mistral Class Amphibious Assault Ship and FS La Fayette, a La Fayette Class Frigate, in the Arabian Sea. The partnership exercise was conducted on March 10-11.

According to the Ministry of Defence, the exercise witnessed a wide spectrum of evolutions at sea which included cross-deck landings, boarding exercises and seamanship evolutions. The seamless conduct of the exercise reaffirmed the interoperability and high level of cooperation between the two navies.

<https://economictimes.indiatimes.com/news/defence/navies-of-india-australia-japan-us-france-and-uk-to-participate-in-exercise-la-perouse/articleshow/98608399.cms>

THE TIMES OF INDIA

Tue, 14 Mar 2023





India Remains World's Largest Arms Importer, with Russia, France & US as the Biggest Suppliers

India continues to languish in the strategically-vulnerable as well as embarrassing position of being the world's largest arms importer, accounting for 11% of the total global imports in 2018-2022, despite the government's continuing thrust on "Make in India" in defence production.

The latest data on international arms transfers released by the Stockholm International Peace Research Institute (SIPRI) on Monday shows Russia remains the largest weapons supplier to India, with 45% of the total imports in the 2018-2022 timeframe, though its share is declining.

France accounts for 29%, displacing the US from the second position by riding on deals like the Rs 59,000 crore one for 36 Rafale fighters. The US, in turn, notched up 11% of the total weapon sales to India.

Top importers of major arms

	Share of global arms imports (%)	
	2018-22	2013-17
 India	11.0%	12.0%
 Saudi Arabia	9.6%	10.0%
 Qatar	6.4%	1.5%
 Australia	4.7%	3.6%
 China	4.6%	4.2%

 Source: SIPRI

India is followed by Saudi Arabia (9.6%), Qatar (6.4%), Australia (4.7%), China (4.6%), Egypt (4.5%), South Korea (3.7%) and Pakistan (3.7%) among the top 10 arms importers.

The top 10 arms exporters, in turn, are the US (40%), Russia (16%), France (11%), China (5.2%), Germany (4.2%), Italy (3.8%), UK (3.2%), Spain (2.6%), South Korea (2.4%) and Israel (2.3%). China, incidentally, accounts for 77% of the arms supplies to Pakistan.

India, which is the world's third largest military spender after the US and China, has taken a series of steps towards achieving 'atmanirbharta' (self-reliance) in defence production. These range from the notification of four "positive indigenisation lists" and increase in the FDI limit to creating "a favourable environment" for Indian vendors and earmarking a record 75% of the defence capital procurement budget for the domestic industry in 2023-24.

On Monday, junior defence minister Ajay Bhatt told Rajya Sabha the expenditure on defence procurement from foreign sources has reduced from 46% of the overall expenditure in 2018-19 to 36.7% as per data till December 2022 due to the various policy initiatives.

But a lot more clearly needs to be done if India has to meet its oft-repeated ambitious target of achieving a domestic turnover of Rs 1,75,000 crore in the defence and aerospace sector, including exports of Rs 35,000 crore, by 2024-25.

As per SIPRI data, India has been the world's largest arms importer since 1993. This underlines India's persisting failure to build a strong defence-industrial base with much larger private sector participation as well as the poor performance by the DRDO, defence PSUs and ordnance factories over the years.

The lack of concrete long-term plans to systematically build military capabilities, with proper inter-Service prioritization, also remains a major problem. This is reflected in existing major operational shortages in fighter jets, submarines, helicopters, anti-tank guided missiles, night-fighting capabilities and the like.

The SIPRI data does show India's arms imports dropped by 11% between 2013-2017 and 2018-2022. "The decrease can be attributed to several factors including India's slow and complex arms procurement process, efforts to diversify its arms suppliers, and attempts to replace imports with major arms that are designed and produced domestically," it said.

Russia was the largest supplier of arms to India in both the 2013-2017 and 2018-2022 timeframes, but its share of total Indian arms imports fell from 64% to 45%. "Russia's position as India's main arms supplier is under pressure due to strong competition from other supplier

states, increased Indian arms production and, since 2022, the constraints on Russia's arms exports related to its invasion of Ukraine," SIPRI said.

<https://timesofindia.indiatimes.com/india/india-remains-worlds-largest-arms-importer-with-russia-france-us-as-the-biggest-suppliers/articleshow/98612920.cms>

The Tribune

Tue, 14 Mar 2023

Govt must Look into Safety Issues with Dhruv

By Air Vice Marshal Manmohan Bahadur (Retd)

The recent ditching of an Indian Navy ALH (Advanced Light Helicopter) Dhruv has rekindled discussions about its safety record; the fact, however, is that the ALH made by Hindustan Aeronautics Limited (HAL) is like no other machine in the world. It was designed and developed as per the IAF's air staff requirement document of 1983, which asked for a helicopter to operate in the dizzy heights of the Himalayas where our Army was, and still is, deployed. Its R&D, certification and manufacturing story is worthy of a research project that would be of immense benefit to our aviation industry as it attempts to meet world standards — to learn what to emulate and also, what not to.

I was associated with the ALH programme in 1988 when it had just started and design specifications were being made; it was the time when a wooden mock-up was being used to try out various fitments; heady days they were, discussing nuts and bolts of a desi machine. The HAL sought, and was given, many concessions to the original operational requirements and by the end of the 1990s, we finally had a helicopter that entered operational service. Keeping it flightworthy and available on the flightline, however, was a nightmare. Snags were many and the supply chain of spares pitiful. The life of many critical components was extremely limited (which was okay, considering that the machine was new), but their servicing took months on end. Helicopters sent for major overhaul sat in Bengaluru for eons and aircraft offered after servicing had endless snags... the lament list is endless. I was Assistant Chief of the Air Staff in 2009-10 looking after transport and helicopter operations and went through this phase. But it was an Indian design and manufacture and one wished that things would improve.

Things started looking up and the HAL sold seven ALHs to Ecuador in 2008 in the face of stiff competition. Alas, it was doomed as four helicopters crashed within a few years — the first one in the Ecuadorian national day parade. As I saw that crash video, I relived the first ALH crash in Bengaluru in 2007 when a Sarang aerobatic team helicopter spiralled to the ground; I was the presiding officer of the Court of Inquiry and we commented on the design characteristic of the rigid rotor system that the ALH is equipped with; the rigid rotor gives it very high manoeuvrability, but it stalls if rolled and pitched beyond a certain rate. These are technical issues that concern the designer and need quick redressal; the incipient cyclic saturation warning took many years for installation after our recommendation made in 2007.

Now, regarding the ditching of the Indian Navy ALH that happened last week, without taking away any credit from the fine work done by the crew for safe recovery, it indeed is providential

that there were no casualties. Very importantly, the Court of Inquiry has a scratch-free helicopter on its hands to find out the cause.

The Navy statement says, “The helicopter experienced a sudden loss of power and rapid loss of height,” and a day later the three services grounded all machines pending investigation. While it is too early to conjecture, but as someone who has been in the business of helicopter flying for four decades, the many recent cases of failure of ‘collective’ or ‘cyclic’ pitch rods come to mind. To the uninitiated, these are the push-pull mechanical rods that are connected to the rotors and enable it to provide lift to fly — move up/down or forward/sideways/rearward etc. These rods are moved by the pilots when they manipulate the ‘cyclic stick’ and ‘collective’ — two primary flying controls in the cockpit. If a rod breaks, it is a catastrophic situation, akin to the breaking of the steering wheel of a car or the tie rod connecting it to the wheels while the car is in motion. The car driver is on the ground and can at least brake for some control; what does a pilot do in the air when his cyclic or collective becomes ineffective? This has been the case with at least five accidents: a fatal one near Allahabad in 2014 where we lost seven personnel, including the Commanding Officer; an ALH Sarang helicopter doing a demonstration at the firepower display at Pokhran in 2009; an IAF ALH high up on the China border in Ladakh; an Army aviation ALH in Leh in 2016; and another one in 2019 with the Army Commander, Northern Command, on board. Is the naval helicopter ditching due to a similar reason? The Navy statement hints at that.

Accidents will happen, but the aim is to keep them spaced apart for as long as possible. Accidents due to human error or equipment malfunction can be prevented by taking procedural and/or technical steps. Design shortcomings, however, are at a foundational level and need immediate institutional remedies. When an aircraft design comes into question, other forces — bureaucratic, institutional and even political — come into play. These have to be avoided like the plague if we want our still-fledgling aviation industry to have a strong foundation. Even one accident is one too many, and here I have narrated five due to the same exceptionally serious cause (anecdotal renderings indicate a few more). It cannot be taken in a chalta hai attitude of a one-time check after every control failure; lives and reputations (of the nation and its aircraft industry) are at stake.

It is time that the government steps in and institutes a truly independent board of professionals to look into all issues with our ALH Dhruv programme.

<https://www.tribuneindia.com/news/comment/govt-must-look-into-safety-issues-with-dhruv-487709>

Business Standard

Tue, 14 Mar 2023

US Defence Budget Speeds toward \$1 Trillion, keeping China in Mind

The Pentagon intends to load up on advanced missiles, space defence and modern jets in its largest defence request in decades in order to meet the threat it perceives from China. The spending path would put military's annual budget over the USD 1 trillion threshold in just a matter of years, its chief financial officer said Monday.

The administration is asking Congress for USD 842 billion for the Pentagon in the 2024 budget year. It's the largest request since the peak of the Iraq and Afghanistan wars in the mid-2000s, when the weight of hundreds of thousands of troops deployed in those overseas conflicts ballooned overseas war spending.

Now, the budget could surge again. That's in part to meet the higher cost of weapons and parts, but also to answer the vulnerabilities that the Ukraine war has exposed in the U.S. defense industrial base, and the strategic threat the U.S. sees from China's rapidly growing nuclear arsenal, its hypersonic capabilities and its gains in space.

Even if it only grows to account for inflation, the budget will hit a trillion dollars, probably before the next five years, Pentagon comptroller Michael McCord told a press briefing. Maybe that's going to be a psychological, big watershed moment for many of us, or some of us, but it is inevitable.

While the number seems astronomically high, it is only about 3% of the country's gross domestic product. For comparison, during World War II the country was spending about one-third of its GDP on defense, McCord said.

The budget request is part of an overall \$6.8 trillion spending proposal rolled out by Biden last week, which Republicans say they'll reject. But it's not clear how they'll act on the Pentagon proposal.

Some Republicans want to go beyond the military spending request. But some have also demanded sharp reductions in federal spending - something that would be difficult to accomplish without touching the defense budget.

While personnel and operations costs remain the largest portions of the annual defense budget, Deputy Defense Secretary Kathleen Hicks called this year's request a procurement budget with the Pentagon increasing buys across the board of modern weapon systems.

One of the largest new priorities is getting the U.S. defense industrial base to speed production of munitions. Ukraine's rate of use of 155 Howitzer rounds and other precision munitions has shown the U.S. defense industrial base is not where it needs to be, McCord said.

It's been a lesson learned over the last year, particularly as the U.S. assesses how best it can prevent a similar fight over Taiwan, which could pit it against China.

The goal of the budget is to ensure China "wakes up every day, considers the risks of aggression, and concludes, today is not the day," Hicks said.

The administration, for example, is asking Congress for USD 30 billion to produce more missiles. But they are not the kind of missiles that are key to the Ukraine fight, McCord said. "These are key to Indo-Pacific deterrence, a goal also involving advanced air-to-air missiles, anti-ship missiles and long-range standoff missiles.

The Pentagon is also seeking rapid modernization of its air, space and nuclear weapons. The request includes almost USD 38 billion to buy new nuclear submarines, field the new B-21 stealth bomber and manufacture new ground-based intercontinental ballistic missiles.

The request would also fund research and testing for a new type of warplane, called Next Generation Air Dominance, which will have a piloted modern fighter jet, such as the F-35, commanding unmanned drones that accompany it on missions. The Air Force won't say much

about the drones, which they are calling collaborative combat aircraft - except that they are planning to field 1,000 of them.

The request includes the largest space budget ever," McCord said, as space has proven to be vital in the war in Ukraine and a critical front in any future confrontation. The Pentagon is seeking USD 33 billion to make its satellite communications more resilient to jamming or attack and rapidly field a new constellation of missile warning systems to assist in the detection, tracking and defense against a new generation of Chinese and Russian hypersonic missiles.

Even the Chinese spy balloon episode had an impact, even though the budget request was largely completed before the balloon was detected, drifted across the country and was shot down. The Pentagon is seeking about USD 90 million to add capabilities to better detect similar objects in the atmosphere in the future.

https://www.business-standard.com/article/international/us-defence-budget-speeds-toward-1-trillion-keeping-china-in-mind-123031400006_1.html

THE TIMES OF INDIA

Tue, 14 Mar 2023

Japan, Britain, Italy Defence Ministers to Meet in Tokyo this Week

Britain and Italy's defence chiefs will visit Japan this week to hold meetings with their local counterpart, Defence Minister Yasukazu Hamada, Japan said on Tuesday.

The three nations announced in December the Global Combat Air Programme (GCAP) venture to develop by 2035 a next-generation jet which would combine the British-led Tempest project with Japan's F-X programme.

Hamada will host a trilateral meeting with British Defence Secretary Ben Wallace and Italian Defence Minister Guido Crosetto on Thursday, Japan's defence ministry said. He will also hold bilateral meetings with them.

The three nations will discuss the jet fighter project, which marks Japan's first major industrial defence collaboration beyond the United States since World War Two.

The trilateral partnership came together last year as France, Germany and Spain moved forward with a rival plan to build a warplane in a broad European bid to strengthen security against the backdrop of Russia's invasion of Ukraine.

<https://timesofindia.indiatimes.com/world/rest-of-world/japan-britain-italy-defence-ministers-to-meet-in-tokyo-this-week/articleshow/98619198.cms>

Science & Technology News



Tue, 14 Mar 2023

Find Solutions to Problems Affecting Industry and Society, CSIR Director General Tells Scientists

N. Kalaiselvi, Director General, Council of Scientific and Industrial Research (CSIR), and Secretary, Department of Scientific and Industrial Research (DSIR), Government of India, on Monday urged young scientists to “adopt” an industry or societal problem and work on it to identify a solution.

Dr. Kalaiselvi was speaking after inaugurating the ‘One Week One Lab’ (OWOL) programme at the National Institute of Interdisciplinary Science and Technology (NIIST). NIIST scientists should start thinking in this direction during the six-day OWOL programme, she said.

Each scientist should select a problem in his/her area of interest and attempt to find the solution in a maximum of two-three years, she said.

CSIR was established to cater to the requirements of Indian industries. At the end of the day, science should reach the common man in terms of domestic, strategic, and societal applications and market-driven requirements, she said. The next 25 years will prove critical for India, particularly in the realm of science and technology, Dr. Kalaiselvi said. Success would be determined by what the Indian youth does during this period.

Three technologies developed by NIIST were transferred to the industry in the presence of the CSIR Director General. They consisted of an innovative technology for manufacturing vegan leather from agro-residues, an Aluminium Silicon Carbide composite thermal management component handed over to Defence Research and Development Organisation (DRDO) for use in fighter planes, and a technology for disinfection and immobilisation of pathogenic biomedical waste into soil additives.

CSIR-NIIST Research Council Chairman Javed Iqbal, CSIR-NIIST Director C. Anandharamakrishnan and Chief Scientist Nishy P. spoke. A Start-up Conclave also was organised on Monday. Dr. Iqbal urged the scientific community to develop products that can emerge as household names globally. Collective effort, as opposed to working in silos, is key to achieving this aim, he said.

Dr. Kalaiselvi inaugurated the stalls of a Millet Exhibition organised as part of the OWOL programme. Over the next few days, NIIST has lined up a series of seminars on energy, environment, strategic and regional materials, agriculture and food processing.

<https://www.thehindu.com/news/national/kerala/find-solutions-to-problems-affecting-industry-and-society-csir-director-general-tells-scientists/article66615671.ece>

Mon, 13 Mar 2023

CSIR-NIIST Commercialises Technology for Making Agro-Waste Leather Substitutes

The CSIR-National Institute for Interdisciplinary Science and Technology (NIIST) here on Monday commercialised an innovative technology to manufacture leather from agro-residues, providing an alternative to animal and synthetic leather in an environment-friendly and cost-effective manner.

This is among threemilestone agreements signed on transfer of technologies developed by scientists of NIIST.

The tie-ups with government and private organisations were formalised in the presence of Council of Scientific and Industrial Research (CSIR) Director General Dr. N Kalaiselvi and CSIR-NIIST Research Council Chairman Prof Javed Iqbal and CSIR-NIIST Director Dr C. Anandharamakrishnan at a function at Bhatnagar Auditorium at the institute here. The pacts, inked at the ongoing 'One Week One Lab Programme' (OWOL) at the institute, also included NIIST's collaboration for indigenous development of thermal-plate components for Aeronautical Development Establishment (ADE)-DRDO and a transfer of technology for sustainable management of pathogenic biomedical waste into soil additives.

NIIST's agro-waste leather substitutes, developed from various agricultural residues and byproducts, has the capacity to effectively replace 30-50 per cent of synthetic chemicals from the existing leather available in the market.

The leather sheet developed from mango peels, banana stems, pineapple wastes, cactus, water hyacinth, corn husk, rice related wastes, costs half that of the synthetic and animal leather. Also, the new product has smaller carbon footprint. The MoU was signed with Streekaya Services Pvt Ltd.

The final product from agricultural residues has shown strong tensile strength, perfect finish, good water-retention properties, temperature resistance and stability compared to other existing synthetic and animal leather.

The product has a shelf life of more than three years. Its eco-friendliness makes agro-waste leather substitutes a better counter to the synthetic variety, which has a booming market valued at USD 30 billion in 2020 and likely to hit USD 40 billion by the end of this decade. The synthetic leather involves toxic chemicals, making it a huge environmental hazard besides its high consumption of energy and water during processing.

As for the second agreement, NIIST will provide technological support to Al-SiC MMC thermal management components that are currently imported and used by ADE-DRDO, Bangalore in Flight Control Computers of Light Combat Aircraft and other fighter aircraft. CSIR's Dr Kalaiselvi handed over the product to Defence Research and Development Organisation.

CSIR-NIIST, in collaboration with ADE-DRDO, indigenously developed Al-SiC thermal plate component by liquid metal squeeze infiltration technique matching the thermal properties of the

imported component. It will contribute in a big way towards import substitution and the national mission of ‘Atmanirbhar Bharat’ in the country’s strategic sector.

Further, NIIST tied up with Bio Vastum Solutions (BVS) to give the Kerala startup a technology for spontaneous disinfection and immobilization of pathogenic biomedical waste into soil additives.

This system, with inherent antimicrobial activity, is capable of disinfecting both liquid as well as solid waste in complete solidification. The treated waste can be disposed as non-regulated medical waste subject to regulatory approval. BVS Pvt. Ltd is based at Angamaly in Ernakulam district.

The OWOL aims at showcasing the legacy, exclusive innovations and technological breakthrough achieved by each of 37 laboratories of CSIR that would support entrepreneurial development in a wide range of areas. NIIST, as a constituent laboratory of CSIR, seeks to further leverage its successful scientific and technological research for the wellbeing of society.

<https://www.uniindia.com/csir-niist-commercialises-technology-for-making-agro-waste-leather-substitutes/south/news/2932649.html>



Mon, 13 Mar 2023

Why a Room-Temperature Superconductor Paper is turning so Many Heads

By Vijay B. Shenoy

A portion of the electricity generated at every power plant is lost during transmission because the wires and cables that carry the current have electrical resistance. We can mitigate this to a large extent if we use a material that does not resist the flow of current. Physicists discovered such materials a century ago: they are called superconductors. They have since realised that superconductors can exhibit truly quantum phenomena that have the potential to enable revolutionary technologies, including enabling efficient quantum computers.

All the materials we know to be superconductors become that way in special circumstances; outside those circumstances, they resist the flow of current. For example, aluminium becomes superconducting at a devilishly cold temperature of less than -250°C .

‘Holy grail’

Physicists and engineers have been toiling to find materials that superconduct electricity in ambient conditions, i.e. at one or a few atmospheres of pressure and at room temperature. Given their potential, finding such materials is one of the holy grails of physics and materials science.

The theory that explains why some materials become superconductors in some conditions suggests that hydrogen and materials based on it could hold great promise in this pursuit. And just as predicted, in 2019, scientists in Germany found lanthanum hydride (LaH₁₀) to be a

superconductor at -20°C , but under more than a million atmospheres of pressure – pressure that is only realised at the centre of the earth!

This is where a new study, published in *Nature* on March 8, enters the plot. Researchers in the U.S., led by Ranga Dias at the University of Rochester, reported discovering room-temperature superconductivity in nitrogen-doped lutetium hydride at roughly a thousand atmospheres of pressure, which is on the face of it a great advance.

What did these investigators do that was new?

The key is the choice of the material; specifically, the authors suggest that the presence of nitrogen is what works the magic. They found a way to push some nitrogen into the crystal of lutetium hydride by developing a high-pressure synthesis process. Superconductivity in the material is brought about by the (microscopic) jiggling motion of the crystal, and the investigators intuited that the right amount of nitrogen could induce the right amount of jiggling: to produce superconductivity at room temperature but without destabilising the crystal.

In fact, the nitrogen-doped lutetium hydride that Dias et al. produced is stable in ambient conditions (with a blue colour) but is not yet superconducting.

When they applied a thousand atmospheres of pressure to this material, it turned red, indicating a change in the nature of the electrons in the material. The scientists also measured the material's electrical resistance, magnetic properties, and thermal properties in these conditions and concluded that the material had become a superconductor.

The data they have reported in their paper shows a sharp drop in the electrical resistance around room temperature, the expulsion of magnetic fields, and a hump in the heat capacity (the sample expels heat from itself when cooled, as the electrons organise into the more-ordered superconducting state). These are all telltale signs of superconductivity, which they found in about 35% of the samples they tested.

Techniques in question

But this story of blue to red is not so black and white. On purely scientific grounds, the claims made by the authors depend strongly on the correctness of the way they processed their data.

For one, the group inferred that the material's electrical resistance had dropped to zero by collecting resistance data and then subtracting the contributions from sources other than the material. The validity of this procedure has to be carefully ascertained; some experts have already expressed an inclination to outright reject the technique as being completely unfounded.

The measurement of the material's diamagnetism (i.e. when it expels magnetic fields) also suffers the same criticism. To measure the heat capacity, the authors have developed a new method that they claim to have validated using a known superconductor, magnesium diboride (MgB_2). This has to be carefully vetted as well.

While there are clearly stated scientific criticisms, they are neither alone nor, among physicists themselves, the most urgent. The principal investigator of this work, Dr. Dias, has had a controversial past. His recent claim of room-temperature superconductivity in a carbonaceous sulphur hydride published in the same journal, *Nature*, was retracted by the editors (as opposed to the authors requesting for it) after several experts pointed to serious problems with the data presented.

Other physicists have also published (non-peer-reviewed) papers online with a lot of supporting data analysis that anyone with the inclination can inspect and study; they directly accuse Dr. Dias of scientific misconduct, including fabricating data. While Dr. Dias has steadfastly denied any wrongdoing, the community's rather bemused reaction to his new paper is understandable.

Scientific curiosity

This said, the scientific curiosity of researchers – and the obvious significance of the discovery that has been claimed – is likely to prevail, and more research groups are likely to explore ways to reproduce the results. The data analysis and subtraction methods used by the authors will be the first to be scrutinised, in microscopic detail.

Further, the fact that the claimed phenomenon is occurring at a thousand-times atmospheric pressure will allow more research groups to enter the fray. The previous systems required pressures of more than a million atmospheres, facilities for which are available only with a handful of groups around the world.

Even if Dr. Dias has cried wolf in the past, will the physics community heed his call this time? The next few months will tell.

Vijay B. Shenoy is Professor, Centre for Condensed Matter Theory, Department of Physics, Indian Institute of Science, Bengaluru.

A portion of the electricity generated at every power plant is lost during transmission because the wires and cables that carry the current have electrical resistance.

All the materials we know to be superconductors become that way in special circumstances; outside those circumstances, they resist the flow of current.

The data they have reported in their paper shows a sharp drop in the electrical resistance around room temperature, the expulsion of magnetic fields, and a hump in the heat capacity (the sample expels heat from itself when cooled, as the electrons organise into the more-ordered superconducting state).

<https://www.thehindu.com/sci-tech/science/explained-why-a-room-temperature-superconductor-paper-is-turning-so-many-heads/article66610762.ece>

