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Newspapers Clippings

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Business Standard

Tue, 28 Jan 2020

Jindal Defence in JV with Brazil's Taurus Armas for making small arms

Initial investment of $5 million, production to start by September

By Aditi Divekar

Mumbai: Delhi-based Jindal Defence, part of O P Jindal Group, today announced its foray into small arms manufacturing in India via a joint venture (JV) agreement with Taurus Armas S.A., of Brazil.

With an initial investment of $5 million in a project that is to be developed in phases, the agreement proposes setting up a plant at Hisar (Haryana). The venture has equity participation from Jindal Defence and Taurus Armas S.A, in the equity ratio of 51:49.

This move by the Abhyuday Jindal-promoted Jindal Defence is expected to bolster Indo-Brazil cooperation in the strategic defence sector, the former said in a release today.

The JV company will make small arms in India based on transfer of technology from Taurus to achieve localisation of production in accordance with the Defence Procurement Procedures, said the release.

This partnership aims to maximise existing domestic opportunities in the small arms manufacturing sector and provide significant support to the ongoing and future modernisation plans of the Armed Forces, particularly the Indian Army, the Para-Military, and State Police Forces.

A NEW VENTURE FOR JINDAL

- The JV proposes setting up of plant in Hisar
- The project is to be developed in phases
- This move by Jindal Defence is expected to bolster Indo-Brazil cooperation in the strategic defence sector

Further, this move is in sync with the government's vision of greater private sector participation in defence hardware manufacturing.

While the production of the arms will take place in Hisar, the venture is expected to come up with its production by September FY21, said a source close to the development.

"The JV company envisages creation of world-class infrastructure along with adoption of best manufacturing practices to achieve perfection in design and engineering, and achieve high quality standards. Moreover, with the technological expertise emerging with this JV, we aim to support the emerging demands of the Indian Armed Forces", the release quoted Abhyuday Jindal as saying.

Currently, Abhyuday Jindal is also the managing director of Jindal Stainless Limited.

Jindal has been eyeing the defence space for a while now. In 2017, as part of its expansion strategy, Jindal Stainless had plans to enter defence, nuclear energy and aerospace among other niche segments.

In March 2017, Jindal Stainless had signed a licence agreement with the Defence Research & Development Organisation (DRDO) to make High Nitrogen Steel (HNS) for armour applications, at the Hisar plant. DRDO was to transfer the technology.

https://www.business-standard.com/article/companies/jindal-defence-in-jv-with-brazil-s-taurus-armas-for-making-small-arms-120012701228_1.html

Business Standard

Tue, 28 Jan 2020

Republic Day parade underlines India's shift from Russian to US weaponry

By Ajai Shukla

New Delhi: The all-time high participation of American-origin aircraft in Sunday's Republic Day parade, alongside a noticeably reduced Russian presence, underlines the growing shift in India's weapons procurement priorities.

While the Indian arsenal continues to field large number of legacy Russian weapons platforms, the new weaponry being inducted is mainly of US or Indian origin.

The American aircraft in the parade included the newly arrived CH-47F Chinook heavy-lift helicopter, the AH-64E Apache attack helicopter, C-130J Super Hercules special operations aircraft and the C-17 Globemaster III strategic airlifter. In addition, the navy's tableau featured the P-8I Poseidon multi-mission maritime aircraft.

In contrast, the parade featured only three Russian aircraft – the Sukhoi-30MKI and MiG-29UPG fighters and the Mi-17V5 medium-lift helicopter. Russian Ilyushin-76 and Antonov-32 transport aircraft also remain in the Indian Air Force's (IAF's) fleet, but were absent, with the more contemporary American C-130J and C-17s being preferred for the parade.

There was also significant participation by Indian-built aircraft, including the Dhruv advanced light helicopter (ALH), its weaponised version called the Rudra, Dornier light transport aircraft, and Jaguar fighter-bombers – all built by Hindustan Aeronautics Limited (HAL). The Netra airborne early warning (AEW) aircraft, developed by the Defence R&D Organisation (DRDO) on a Brazilian Embraer business jet was also showcased in the parade.

Meanwhile, the IAF tableau featured the indigenous light combat aircraft. The IAF has finalised, and is shortly slated to sign with HAL, an approximately Rs 26,000 crore order for 83 Tejas Mark 1A fighters.

Similarly, ground systems participation, which has traditionally featured a large number of Russian weapons platforms, was noticeably biased towards indigenous and non-Russian weaponry. The only Russian ground systems featured were the T-90S Bhishma tank and BMP-2 infantry combat vehicle – which both continue to form the backbone of India's armoured forces.

Meanwhile, Indian systems included the new K-9 Vajra-T self-propelled medium artillery gun (designed by South Korea and built by Larsen & Toubro in India), the Ordnance Factory's Dhanush medium artillery gun and the DRDO's Sarvatra assault bridge and eponymous Short Span Bridging System. The DRDO's promising Advanced Towed Artillery Gun System (ATAGS), which participated last year, was conspicuous by its absence.

There was a strong Indian flavour to missile and air defence systems as well. There was a debut appearance for the DRDO-developed Anti-Satellite Weapon (ASAT), which was ostentatiously tested last March in the so-called Mission Shakti – arousing international criticism, albeit shortlived, for allegedly creating space debris.

In the air defence arena, which was dominated by a range of Russian missiles for half a century, this year's parade featured only DRDO's Akash missile system, which is being deployed in numbers on the China border, even as an upgraded version is developed. Also on display was the DRDO's eponymous Air Defence Tactical Control Radar (ADTCR), which will control the air defence campaign, being used for surveillance, detection, tracking, identifying and engaging enemy aerial targets from multiple command posts and missile launchers.

However, a new Russian air defence system could well occupy centre stage in next year's parade, with delivery of the first Russian S-400 Triumf missile units slated for late-2020. India has defied strong pressure from Washington in going ahead with the purchase of five S-400 units from Russia for $5.43 billion.

In addition to the large number of weapons systems that debuted in this years parade – including the Chinook and Apache helicopters, the K-9 Vajra-T and the DRDO's promising Astra missile (in the DRDO's tableau) – the military scored two other significant firsts on Sunday.

For the first time, the prime minister paid homage to soldiers, sailors and airmen who had laid down their lives for the country at a new location – the National War Memorial that was inaugurated last February. Until now, prime ministers have paid homage at the Amar Jawan Jyothi (eternal flame) memorial at India Gate.

Also unprecedented was the presence of a tri-service Chief – the newly created appointement of Chief of Defence Staff (CDS), to which former army chief, General Bipin Rawat, was appointed on the new year. The prime minister and president were, for the first time, received by four general rank officers – the CDS and the three service Chiefs.

THE TIMES OF INDIA

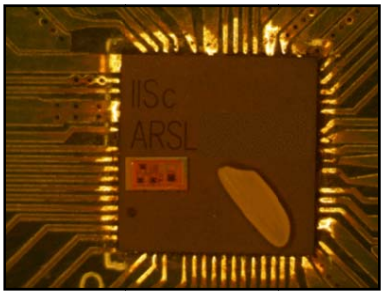
Tue, 28 Jan 2020

IISc build through-the-wall radar on chip smaller than grain of rice

By Chethan Kumar

Bengaluru: Researchers at the Indian Institute of Science (IISc), in a significant breakthrough, have developed a "through-the-wall" radar (TWR), built on a chip smaller than a grain of rice.

The team of scientists was led by Gaurab Banerjee, associate professor at the Department of Electrical Communication Engineering.



Developed using Complementary Metal Oxide Semiconductor (CMOS) technology, this radar has a single transmitter, three receivers, and an advanced frequency synthesizer capable of generating complex radar signals, all packed together into a tiny chip.

Its small size, researchers said, can enable mass production at a low cost. "Such radars can have wide-ranging applications in the defence sector, as well as areas such as healthcare, transportation and agriculture," a statement IISc shared with TOI, reads.

“Only a handful of countries in the world today have the ability to put the entire electronics of radar on a chip,” says Banerjee.

The TWR imaging has always been one of the most challenging radar design problems, Banerjee says, explaining: "For one, the signal can get significantly damped while passing through walls. To overcome this, radio waves consisting of a large number of frequencies need to be used, which can complicate the design. "

" ...These radars also use a more complex signal, known as a chirp, which requires customized electronics such as a microwave transmitter, a receiver and a frequency synthesizer. "

With their design, the IISc team has now managed to squeeze all of these electronic components into a single, tiny chip. They used new architectural and circuit design techniques to overcome challenges specific to radars – such as the design of a wide fractional bandwidth transceiver, the statement reads.

“The same design techniques that have enabled smaller and cheaper smart phones can now be used to miniaturize the complex electronics of a radar system into a small chip,” says Banerjee.

Although the chip was originally developed for airport security-related applications, Banerjee’s group is also exploring applications in other areas such as healthcare.

For instance, it can be used to monitor the health of elderly people.

“It might be possible for a centrally-placed TWR system to scan the house, and construct a model of when a person is standing or sitting down. If there is a sudden change in gait due to a fall, it can trigger an alarm,” says Banerjee, adding that it could also monitor breathing and respiration rates and assess the severity of a fall.

This research was funded by the IMPRINT programme of the Government of India, with additional financial contributions from the Ministry of Human Resource Development (MHRD) and the Defence Research and Development Organization (DRDO).

Bharat Electronics Limited (BEL), a defence PSU, has been an active industrial partner in this IMPRINT project since its inception.

https://timesofindia.indiatimes.com/india/iisc-build-through-the-wall-radar-on-chip-smaller-than-grain-of-rice/articleshow/73670592.cms

NORTHEAST NOW

Tue, 28 Jan 2020

Assam: Tezpur University to host mega food convention

The Association of Food Scientists & Technologists (India), AFSTI Tezpur Chapter, is going to organize the 27th Indian Convention of Food Scientists and Technologists (ICFoST).

The event is hosted by the Department of Food Engineering and Technology, Tezpur University in Assam's Sonitpur district from January 30 to February 1, 2020.

The theme this year for the convention is 'Raising Agro-processing and Integrated Novel Technologies for Boosting Organic Wellness (RAINBOW)'.

This theme will focus mainly on the integrated development of organic capital of the nation, especially the Northeast to promote agro-processing, food safety and the advanced technologies for enhancing the organic wellness.

During the conference, over 50 leading food scientists, researchers and policy makers from across the country will share their experience and knowledge and the young students will share their innovative ideas to fulfil the objectives of the convention.

Some of the prominent names include CFTRI, Mysuru, DRDO, New Delhi, DFRL, Mysuru, IIT, Kharagpur, IIFPT, Thanjavur, NIFTEM, Sonipat and SLIET and many more.

The food industry personnel from across the country are also attending the convention for bridging the gap between academia and industry.

These include Exelon Foodbio Advisors Private Limited, Mumbai, Marico Mumbai, Kaleesuwari Refinery Private Limited, Chennai, Food Ingredient Specialities Private Limited, Chennai, Adani-Wilmar, Suhana, FIL and Johnson & Johnsen.

NABARD and FSSAI are also actively participating in the event.

A Food and wellness expo will also be organized during the convention.

The convention will be inaugurated on January 30 at Tezpur University in the presence of Dr AK Singh, DG Life Sciences, DRDO as Chief Guest.

The organizing patrons, Prof Vinod Kumar Jain, the Vice Chancellor, Tezpur University, Dr KSMS Raghavarao, director, CSIR-CFTRI, Mysuru and Dr Anil DuttSemwal, director DRDO-DFRL, Mysuru and president of AFSTI, Dr V Baskaran will grace the inaugural event.

AFSTI officials said the AGBM of the AFSTI will also be organized during the conference.

https://nenow.in/north-east-news/assam/assam-tezpur-university-to-host-mega-food-convention.html

THE ECONOMIC TIMES
WWW.ECONOMICTIMES.COM

Tue, 28 Jan 2020

GRSE set to deliver ASW corvette INS Kavaratti to Navy soon

'Kavaratti' is the last of the four Anti-Submarine Warfare (ASW) stealth corvettes built by the GRSE for the Indian Navy under Project P28, Chairman-cum-Managing Director Rear Admiral V K Saxena said. "All trials of the ship have been successfully completed, and we plan to deliver it by the end of this month," Saxena told PTI here

Kolkata: Adding to Indian Navy's firepower, Defence PSU Garden Reach Shibuilders and Engineers (GRSE) is set to deliver anti-submarine warfare stealth corvette INS Kavaratti to the Navy soon, its Chairman-cum-Managing Director Rear Admiral V K Saxena said.

'Kavaratti' is the last of the four Anti-Submarine Warfare (ASW) stealth corvettes built by the GRSE for the Indian Navy under Project P28, he said.

"All trials of the ship have been successfully completed, and we plan to deliver it by the end of this month," Saxena told PTI here.

'Kavaratti' will be the 104th ship to be constructed and delivered by the GRSE, he said.

With a displacement of 3,300 tonnes, the ship has a carbon composite superstructure, which has been flawlessly integrated with the steel hull through technology developed by the GRSE.

"The carbon composite superstructure provides advangate of a lower weight of the warship, thus increasing its stability, manoeuvrability and faster acceleration," Saxena said.

The new technology will mean that the warship, which has 90 per cent indigenous components, will also require lower maintenance, he said.

The ship is equipped to fight in nuclear, chemical and biological warfare conditions and its weapons and sensors suite is predominantly indigenous, according to Defence sources.

The first of the four ASW stealth corvettes under Project P28 - 'Kamorta', was delivered to the Navy in July 2014, 'Kadmatt' was delivered in November, 2015 and 'Kiltan' was delivered in October 2017, a GRSE official said.

All these four corvettes under the project are named after islands in the Lakshadweep archipelago in the Arabian Sea, he said.

The GRSE currently has a strong order book position of around Rs 27,400 crore under which there are a total of 19 warships at various stages of construction under six projects that are underway, the official said.

Of these, five projects are of the Indian Navy and one is of the Indian Coast Guard.

The Defence PSU has delivered five warships to Indian Navy in last 10 months, between March 2019 and December 2019, he said.

https://economictimes.indiatimes.com/news/defence/grse-set-to-deliver-asw-corvette-ins-kavaratti-to-navy-soon/articleshow/73654677.cms?from=mdr

The Tribune
VOICE OF THE PEOPLE

Tue, 28 Jan 2020

Army looks to pvt players for tank auxiliary engines

By Vijay Mohan

Chandigarh: The Army has approached the Indian industry to indigenously develop an auxiliary power unit (APU) for its fleet of Russian-made T-72 and T-90 battle tanks, that help not only conserve the life of the main engine but also reduce thermal and acoustic signatures when deployed in specific situations.

The Army's requirement is for 3,257 APUs, which include 1,657 units for the T-90 and 1,600 units for the older T-72, which are the mainstay of the mechanised forces, according to an expression of interest issued today. Only Indian entities are eligible for the project under the 'Make in India' scheme.

According to Army sources, the "Acceptance of Necessity" for having APUs fitted on tanks was accorded by the Ministry of Defence in October 2019 after undertaking feasibility studies and Rs 1,325.92 crore have been earmarked for the purpose.

An APU is a small engine or powered device on a vehicle that provides energy for functions other than propulsion. They are commonly found on large aircraft and naval ships as well as some large land vehicles. Though not commonly found, the concept of APUs on tanks dates back to World War II when these were mounted on American Sherman tanks.

According to the Army's requirements, the APU should be able to concurrently operate the gunner, commander and driver sights, fire control system, radio sets, internal communication systems, navigation aids and charge batteries when the main engine is switched-off.

The APU should be able to function for a stretch of six hours at a time in temperatures ranging from minus 50 °Celsius to 45 °Celsius and at altitudes ranging up to 16,000 feet.

Since the APU would be mounted on the exterior, it would also be required to be waterproof up to a depth of five metres to enable deep-fording by the tank.

The APU would cater to power requirements when deployed in the surveillance mode during a lull in battle and during breaks or layovers in training.

At present, the main engine has to be kept running to operate the systems even if the tank is stationary. Besides reducing war and tear of the main engine, the APU would increase the tank's stealth capabilities since the noise and heat emission would be much lower. The Army is also looking at developing solar powered APUs for armoured vehicles.

* An APU is a small engine or powered device that provides energy for functions other than propulsion

* The APU increases tank's stealth capabilities since the noise and heat emissions are much lower

* Army's requires 3,257 auxiliary power unit, including 1,657 units for T-90 and 1,600 units for the older T-72

https://www.tribuneindia.com/news/army-looks-to-pvt-players-for-tank-auxiliary-engines-32092

THE NEW INDIAN EXPRESS

Tue, 28 Jan 2020

With Over 1,000 companies DefExpo 2020 will be the biggest ever: Defence Ministry

The number of participating foreign companies in the Defence Expo has also increased to 165 from the previous figure of 160 as informed by the Ministry of Defence

By Mayank Singh

New Delhi: the Defence Expo 2020 in Uttar Pradesh's Lucknow city is going to be by far the biggest expo as a high number of companies have registered this year. The number of international companies confirming their presence at the expo has also gone up as compared to previous expos.

Ministry of Defence (MoD) in its release said, 'The number of companies registered for participating in the 11th edition of the biennial mega defence exhibition, DefExpo 2020, to be held at Uttar Pradesh capital Lucknow between February 5-9, 2020; has reached 1,000. In the DefExpo 2018, held in Chennai, 702 companies had participated. Thus, it has become by far the biggest ever DefExpo to be held in India.'

The number of participating foreign companies has also increased to 165 from the previous figure of 160 as informed by the Ministry. Apart from this, over 70 countries are expected to participate.

The booked exhibition space by exhibitors for DefExpo 2020 has gone up by 60 per cent to over 42,800 square metres, compared to around 26,774 during the last edition.

Ministry informed that Defence Ministers and Service Chiefs of 35 countries have confirmed their participation for the DefExpo. 'A substantial number of Memoranda of Undertaking (MoUs) are expected to be inked during the Expo, resulting in forging of new business collaborations.' said the MoD. The theme of this year's Expo is 'India: The Emerging Defence Manufacturing Hub'. The Expo also has a sub-theme called 'Digital Transformation of Defence' which aligns with the concept of the future battlefield.

Apart from displaying industrial prowess and huge potential for the investors, the UP government will organise several cultural programmes showcasing rich cultural heritage of the northern state. A unique experience for the visitors is planned at the Tent City, which is being especially erected at the venue. The Central government has set up the Defence Industrial Corridor in Uttar Pradesh. In this regard, the Government of UP has planned to build a defence manufacturing corridor along with the proposed Bundelkhand Expressway which will help in making India self-reliant in the field of defence production.

The expo will play a positive role as, 'The DefExpo will play the role of a catalyst in attracting not only investments but also cutting-edge technologies to the region.' Ministry of Defence said.

The show will be marked with numerous attractions such as live demonstrations of the services, DPSUs and industry showing the land, naval, air and internal security systems in action.

Also, business seminars will be organised by both international and Indian Industry chambers viz.

Confederation of Indian Industry (CII), Federation of Indian Chambers of Commerce & Industry (FICCI), PHD Chamber of Commerce and Industry, National Skill Development Corporation (NSDC), SYNERGIA, Directorate of Standardisation (DOS)/Department of Defence Production (DDP), US-India Business Council (USIBC), US-India Strategic Partnership Forum (USISPF), etc.

https://www.newindianexpress.com/nation/2020/jan/27/with-over-1000-companies-defexpo-2020-will-be-the-biggest-ever-defence-ministry-2095257.html

Tue, 28 Jan 2020

DefExpo 2020: Bharat Dynamics to display Amogha-3 new antitank missile

India's Bharat Dynamics Limited (BDL) will display its new third-generation anti-tank guided missile (ATGM) for the first time at DefExpo-2020 exhibition in Lucknow.

"Bharat Dynamics Limited, one of India's manufacturers of ammunitions and missile systems, will be showcasing, for the first time, its in-house developed 3rd-Generation Fire and Forget ATGM at DefExpo2020 in Lucknow," read a tweet posted on the official DefExpo-2020 Twitter account.

According to idrw.org, the ATGM will be named Amogha-3, developed from BDL's older Amogha-1 (2.8km range, wire-guided technology) and Amogha-2 (wireless ATGM with RF guidance) missiles. The third-generation missile will reportedly be equipped with an active imaging infra-red seeker to supplement a Man-Portable Anti-Tank Guided Missile (MPATGM) system built by state-run DRDO. Using TVC for extreme maneuverability, Amogha-3 uses a dual thrust propulsion.

https://www.armyrecognition.com/defexpo_2020_news_show_daily/defexpo_2020_bharat_dynamics_to_display_amogha-3_new_antitank_gun_missile.html

NEWS18

Tue, 28 Jan 2020

A look at the mighty fighter jet fleet of the Indian Air Force: Rafale, Tejas, Sukhoi and more

As India celebrate its 71st Republic Day, we take a look at the mighty fighter jet fleet of the Indian Air Force

By Arjit Garg

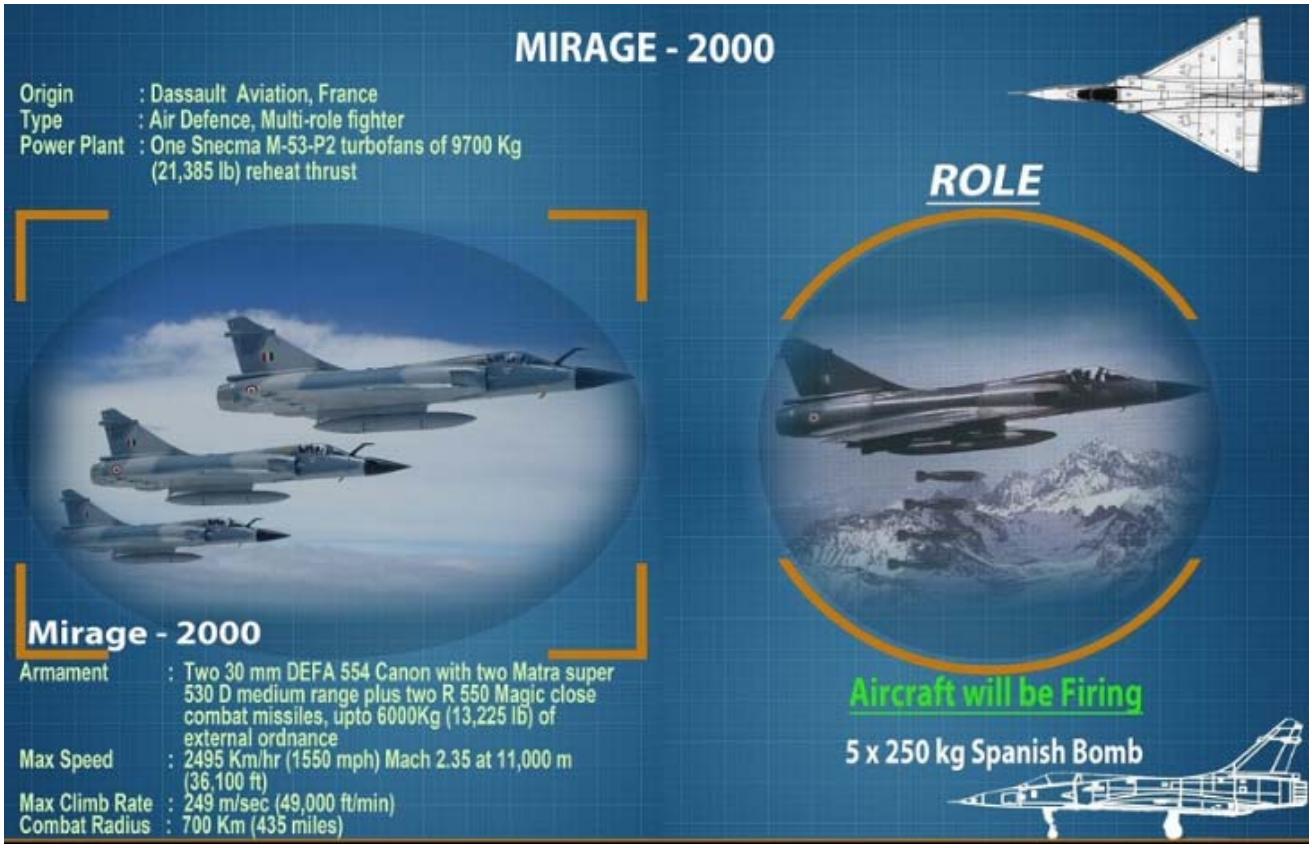
India celebrated its 71st Republic Day on 26th January, 2020 and like every year, Indian Air Force hosted a spectacular air display at the Republic Day Parade that included attack and transport aircrafts of the IAF. 41 Aircrafts including helicopters, jets and transporters participated in the parade, while combat ready attack helicopter Apache and Chinook made their debut. Unfortunately, both Rafale and Tejas were not on display, however Sukhoi Su-30 MKI performed some daredevil stunts. Here's a list of all the active fighter jets also called the multi-role fighters and strike aircraft owned by the Indian Air Force, from Sukhoi Su30MKI to the Tejas LCA.

Rafale

India had signed an inter-governmental agreement with France in September 2016 for procurement of 36 Rafale fighter jets at a cost of around Rs 58,000 crore. The aircraft is capable of carrying a range of potent weapons and missiles and the first squadron of the aircraft will be deployed at Ambala air force station, considered one of the most strategically located bases of the IAF. The Indo-Pak border is around 220 km from there. The second squadron of Rafale will be stationed at Hasimara base in West Bengal. The Rafale is a modern fighter jet known for its agility, speed, weapon holding capacity and attack capability. The Dassault Rafale has a delta wing design and is capable of g-forces as high as 11g (in case of emergency). The Rafale is available in both single and dual seating cabin (India ordered 28 single and 8 dual seater Rafale).

Mirage-2000

The Mirage-2000 is undoubtedly one of the Indian Air Force's (IAF) most versatile and deadliest aircraft and it was first commissioned in 1985. Soon after inducting the Mirage, IAF gave it the name – Vajra – meaning lightning thunderbolt in Sanskrit. The Mirage-2000 is developed by Dassault Aviation and took its first flight in 1978 and was inducted in the French Air Force in 1984. India placed an initial order of 36 single-seater Mirage-2000 and 4 twin-seater Mirage 2000 in 1982 as an answer to Pakistan buying the US-made F-16 fighter jets by Lockheed Martin. The Mirage-2000 played a decisive role in the 1999 war of Kargil and seeing the success of the jets, the government in India placed an additional order of 10 Mirage-2000 planes in 2004, taking the total tally to 50 jets.



HAL Tejas LCA

India has long borrowed its fighter jets from countries like Russia, France and Britain under a license agreement to manufacture it locally by Hindustan Aeronautics Limited. However, back in the 1980s the HAL started the Light Combat Aircraft (LCA) programme to replace the ageing Soviet sourced MiG-21. With India's former Prime Minister giving the LCA its name – Tejas – the 1st indigenously built fighter aircraft was inducted in the Indian Air Force with the IAF placing a 20 jet order initially and the 1st Tejas Squadron was formed in 2016 called the Flying Daggers. Till now IAF has placed an order of 40 Tejas Mk 1, including 32 single-seat aircraft and eight twin-seat trainers. IAF has also initiated procurement of a further 73 single-seat fighters in Mk 1A configuration.

Mikoyan MiG-21

The first supersonic jet aircraft in aviation history, the MiG 21 is one of the most known fighter jets on Earth. Having served 60 countries over a course of 60 years, the MiG 21 is still in service in many countries, including India. In 1961, IAF opted for the Mikoyan-Gurevich Design Bureau made MiG 21 and since then has bought more than 250 estimated units of this incredibly competent planes. While the 21s played a pivotal role in the 1971 India Pakistan War, they are currently being used only as Interceptors with a limited role as fighter jets and IAF will soon replace the remaining units of the MiG21 Bison with the Tejas LCA. The MiG 21 has a single-seater cockpit with a maximum speed of 1.05 mach (1300 kmph).

Sukhoi Su-30MKI

The Sukhoi Su-30MKI is the most advanced fighter jet in operation with the Indian Air Force and is the primary air to air and air to ground strike machine. Also known as Flanker (NATO), the Su-30 MKI is built in India by HAL under a license agreement with Russia's Sukhoi. The Su-30MKI is exclusively used by India and there's an estimate that IAF has 290 operational units of 30MKI till now. The first unit was inducted in 2002. The Sukhoi Su-30MKI has a top speed of Mach 2 (2120 kmph) and has a maximum takeoff weight of 38,800 kg. The jet can carry a wide range of equipment from radars to missiles, bombs and event rockets.

Mikoyan MiG-27

The MiG 27 is again Soviet sourced ground-attack aircraft designed by Mikoyan-Gurevich Design Bureau from the Soviet Union and manufactured by HAL under a license agreement. The MiG27 is known as 'Bahadur' (meaning Valiant in English) in India and the IAF retired the last 27 ML squadron in 2017. India is only among a handful of countries who still operates the updated MiG-27 UPG ground attack aircraft. The 27s are based on the MiG23 with a redesigned nose and flies low altitude.

SEPECAT Jaguar

The SEPECAT Jaguar is a fighter jet developed together by British Royal Air Force and French Air Force. Only the Indian Air Force is currently using the upgraded Jaguar in active duty. The SEPECAT Jaguar is known as Shamsher and serves IAF as primary ground attack aircraft. Indian Jaguar is quite different from the RAF's Jaguar and are built locally by HAL under a license agreement. IAF recently upgraded its entire fleet of Jaguars by adding Avionics support. The only problem with the Jaguar is its inability to fly high altitude with heavy load on board.

Mikoyan Gurevich MiG - 27

Origin : Mikoyan Aviation Scientific Industrial Complex, Russia.
Type : Tactical strike & fighter bomber
Power Plant : One Tumansky R29B-300 turbojet of 11,500 kg (25,350 lb st) with reheat

Bahadur

MiG-27

Armament : One 30 mm multi barrel canon and upto 3000 kg of ordnance which can include 500 kg bombs, 57 mm rockets.
Max Speed : 1885 km/h (1171 mph) at 8,000 m 26,250 ft) at Mach 1.77
Range : 250 km with maximum load.
Combat Radius : (Low level) 780 km (480 mls).
Service Ceiling : 15,250 m (50,000 ft).

ROLE

Aircraft will be Firing

40 x 80 mm Rockets
2 x S-24 Rockets

Origin : SEPECAT, U.K / France
Hindustan Aeronautics Limited, India
Type : Ground attack fighter, maritime role
Power Plant : Two Rolls Royce/Turbomeca Adour MK 811 turbo fan jet of 3740 kg (8400 lb thrust) with after burning.

Jaguar
(SHAMSHER)

Jaguar

Armament : Two 30 mm Aden canons plus two R 550 Magic CCMS (overwing) Maximum external stores loading of 4750kg (10,500 lb.) Cluster bombs and 68 mm rocket pods
Max Speed : 1350 km/hr (840 mph) or mach 1.1 (Sea Level) 1700 km/hr (1046 mph) or mach 1.6 at 11,000 m (36,000 ft)
Combat Radius : 575 km (357 mls) Lo-Lo-Lo

ROLE

Aircraft will be Firing
3 x 1000 lbs RTU
3 x 1000 lbs NTU

Mikoyan MiG-29

Last on our list is another Soviet Mikoyan-Gurevich Design Bureau produced MiG called the MiG 29. Introduced in the 1970s to counter U.S. F-Series planes like F-15 and F-16 the MiG29 is known as Baaz (Hindi for Hawk) and forms the second line of defence after the Sukhoi Su-30MKI. The MiG-29 is exported to more than 30 nations, India being the first and one of the largest exporters of this jet. The IAF currently uses the upgraded MiG-29 UPG, the most advanced MiG-29 variant ever. The MiG29 were used extensively during the Kargil War by the Indian Air Force to provide escort for Mirage-2000 attacking targets with laser-guided bombs.

https://www.news18.com/news/auto/a-look-at-the-mighty-fighter-jet-fleet-of-the-indian-air-force-rafale-tejas-sukhoi-and-more-2473707.html

नवभारत टाइम्स

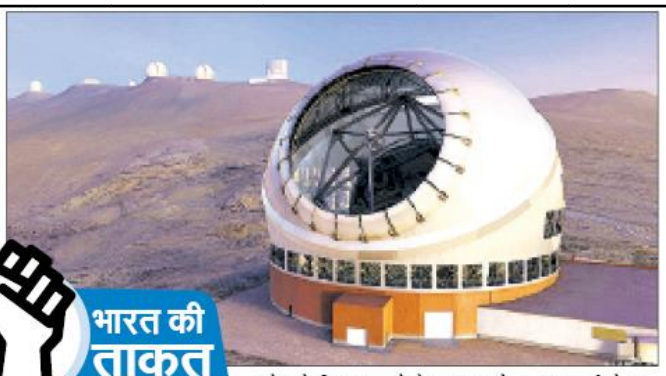
Tue, 28 Jan 2020

भारतीय वैज्ञानिक दुनिया के सबसे बड़े टेलिस्कोप की आंख बनाने में जुटे

हाई रेजॉल्यूशन का स्पेक्ट्रोमीटर बना रही है भारत की टीम

■ टीएनएन, नई दिल्ली

दुनिया के सबसे बड़े टेलिस्कोप को बनाने में भारत की भूमिका और बड़ी होती जा रही है। इस थर्टी मीटर टेलिस्कोप (टीएमटी) के सेंसर, मिरर, इलैक्ट्रॉनिक्स के अलावा अब भारत के वैज्ञानिक इसका हाई रेजॉल्यूशन ऑप्टिकल स्पेक्ट्रोमीटर (एचआरओएस) भी तैयार कर रहे हैं। स्पेक्ट्रोमीटर वह डिवाइस है जिसके जरिए प्रकाश किरणों को इकट्ठा किया जाएगा और यह पता लगाया जाएगा कि कौन-सा मटीरियल इस प्रकाश को पैदा कर रहा है। वैज्ञानिकों को उम्मीद है कि इस टेलिस्कोप के जरिए पहली गैलेक्सी के बनने और मिल्की वे की पड़ोसी गैलेक्सियों के बारे में ज्यादा जानकारी मिलेगी। इस टेलिस्कोप का निर्माण हवाई में किया जा रहा है। स्पेक्ट्रोमीटर को बनाने में करीब 435 करोड़ का खर्चा आएगा जिसे टेलिस्कोप के लिए बने फंड से लिया जाएगा। फंड में भारत समेत अमेरिका, जापान, कनाडा और चीन का हिस्सा है। बेंगलुरु के इंडिया इंस्टिट्यूट ऑफ एस्ट्रोफिजिक्स (IIA) में टीएमटी सेंटर बनाया गया है।



भारत की ताकत

स्पेक्ट्रोमीटर बनाने में 435 करोड़ का खर्चा होगा

दुनिया का सबसे अडवांस टेलिस्कोप होगा

यह टेलिस्कोप दुनिया का सबसे अडवांस टेलिस्कोप होगा जो जमीन से काम करेगा। साल 2030 तक इसके शुरू होने की उम्मीद है। यह टेलिस्कोप यह पता लगाएगा कि पहला तारा कैसे बना। ब्लैक होल, डार्क एनर्जी और एलियन की मौजूदगी के कई रहस्यों से यह पर्दा उठाएगा।

बेंगलुरु के इंस्टिट्यूट में स्पेक्ट्रोमीटर पर काम करते वैज्ञानिक

कई देशों ने पेश किया था डिजाइन, भारत का चुना गया

स्पेक्ट्रोमीटर का डिजाइन भारतीय टीएमटी की टीम ने ही सुझाया है। कई दूसरे देशों ने भी इसका डिजाइन सुझाया था लेकिन टीएमटी की साइंस अडवाइजरी कमिटी ने भारतीय टीम का डिजाइन चुना। इसका रेजॉल्यूशन अभी तक मौजूद किसी भी स्पेक्ट्रोमीटर की तुलना में काफी ज्यादा है। यह 25 हजार, 50 हजार और एक लाख रेजॉल्यूशन तक पहुंच सकता है। डिजाइनिंग टीम में शामिल IIA की प्रोफेसर सिवारानी तिरुपति ने बताया कि पहली बार हम ऐसा स्पेक्ट्रोमीटर बना रहे हैं जो हमारी गैलेक्सी से आगे देख सकेगा। इससे पता लगाया जाएगा कि बिग बैंग के बाद हाइड्रोजन, हीलियम, लिथियम जैसे तत्व कैसे बने। इंडिया टीएमटी के प्रोजेक्ट डायरेक्टर ईश्वर रेड्डी ने बताया कि यह स्पेक्ट्रोमीटर पहले तारे के बनाने की जानकारी हमारे सामने रखेगा। इसका काम जोर-शोर से जारी है। प्रोजेक्ट से जुड़ी वैज्ञानिक रम्या सेतुरम ने बताया कि भारत इस ताकतवर टेलिस्कोप के लिए 86 मिरर बना रहा है। इन्हें बनाने में करीब 10 साल का समय लगेगा।'

टेलिस्कोप के लिए 86 मिरर भी बना रही है भारतीय टीम