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

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The Tribune

Mon, 29 Nov 2021

Stress among female employees higher but job satisfaction also more as compared to males, says DRDO study

The study observes higher psychological well-being in public sector employees than those in the private sector

By Vijay Mohan

Chandigarh: Though perceived stress among female employees is higher, job satisfaction level in females is slightly more than their male counterparts, a study published recently by the Defence Research and Development Organisation has revealed.

Further, government employees were more satisfied with their jobs than private-sector employees, with perceived stress among private-sector employees being higher. The study observed higher psychological well-being in public sector employees than those in the private sector.

“The government sector has superior democratic functioning and involves less time-bound target projects, which is not the case in the private sector. Moreover, positive relations with others can be established if one finds people to be on the same level in terms of liking, choices, and decisions. It provides government personnel in India a modest advantage because they spend the majority of their time in the same departments and promotions are time-limited, which is not the case in the private sector,” the study observed.

Titled “Effect of Job Satisfaction on Psychological Well-Being and Perceived Stress among Government and Private Employee,” the study was undertaken by experts from the Defence Institute of Psychological Research, New Delhi, Amity Institute of Psychology and Allied Sciences, Noida and Department of Psychology, School of Humanities and Language, Phagwara, Punjab.

The purpose of the study, according to the its authors, was to shed light on the effect of job satisfaction, psychological well-being and perceived stress among government and private employees. The well-being and health of individuals is influenced by job satisfaction, which is explained as the mental gratification derived from employment.

The results determine that the deadline-based work, or the over-burdening positions in the private sector or in the government sector, can be one major cause for stress, the authors said.

“Studies have revealed that in the Indian context, there is more freedom and cooperation in the government sector, while strict attendance policy in terms of absenteeism is taken into account and an ‘always on the toes-attitude’ has been part of the private sector,” the authors observed.



Photo for representational purpose only. File

Another “striking result” put forth by the authors showed a significant negative correlation of autonomy and positive relationships with perceived stress. The existence of a negative correlation can be explained in a way that when an individual has more autonomy, he or she has less stress.

Pointing out that having a sense of control over one’s work reduces stress, the authors observed that the locus of control plays a significant part in foreseeing the level of job satisfaction, stress and performance. Further, positive relationships have a negative association with perceived stress, implying that social support is always positively related with and caters to reducing stress in every aspect of life, including employment.

<https://www.tribuneindia.com/news/nation/stress-among-female-employees-higher-but-job-satisfaction-also-more-as-compared-to-males-says-drdo-study-343797>



Sun, 28 Nov 2021

AI powered drone new tool of warfare

Real-time systems using AI for navigation and guidance, coordination, self-healing, target identification and acquisition & munition delivery systems are a strategic asset. Drone warfare is asymmetric and is almost mainstream. A bit like guerrilla warfare as it is low cost. Drones are dispensable; off the shelf commercial technology can be used, say Bhargav and Aweek Sen

By Bhargav, Aweek Sen

Command, control, communications and intelligence, surveillance and reconnaissance (C4ISR) are becoming a most essential element in modern military operations. Countries with artificial intelligence powered drone have baffled their enemies in the war zone. AI powered drone swarms are the new tool of warfare and as of now are unregulated by weapons control regulations.

Though Israel and Turkey have successfully used them, India too is not far behind. On November 17, 2021, the Defence Research and Development Organisation (DRDO) demonstrated offensive capabilities of its drone swarms at a three-day “RashtraRakshaSamarpanParv” in Jhansi. It was impressive.



The country that makes advances quickly joins an elite club that might evade future restrictions.

“The DRDO demonstrated fully operational decentralised UAV (unmanned aerial vehicle) swarm comprising 25 drones flying coherently with minimal human intervention, during Rashtriya Raksha Samarpan Parv during Jhansi Jalsa,” reported PTI.

In mid-May 2021, the latest developments on these weapons systems occurred when the Israel Defense Forces (IDF), during the recent clashes in Gaza, used a swarm of AI drones for the first time to geolocate, target, and strike Hamas members.

Israel is making major advances in AI-driven technology.

The IDF did debut “drone swarms to seek and attack hidden targets” in the May war in Gaza. The Ghost Unit, which is part of the Paratroopers Brigade, has been using “packs of drones”. The IDF used a swarm of AI-guided drones and supercomputing to comb through data and identify new targets within the Gaza Strip. It is thought this is the first time a swarm of AI drones has been used in combat.”

The drones used so far are navigated in two ways — either remotely piloted or autonomously piloted with GPS and inertial navigation systems.

Autonomous drones have terrain matching capability. They use information from the cameras along with AI for navigation without being dependent on GPS, which is vulnerable to cyber-attacks.

A drone swarm can be modelled as a flying wireless grid, where each drone is capable of using and sending information to the others in the swarm. Converting data into actionable real-time information is done using AI. The reaction time in a battlefield must be less than the reaction time of the enemy elements. Therefore, swarm drones assess the threat to the swarm and at the same time identify the target to manoeuvre to achieve the desired strike, adjusting according to any losses they suffer.

There can be some sort of task sharing, where some of the drones would undertake target detection, others to counter the enemy air defence, some more counter the interference of enemy radars and electronic signals, and others will carry out the attack by bombing. In a dynamic environment, this autonomous coordination is done with the help of AI technologies.

Some inferences:

1. Drone warfare is asymmetric and is almost mainstream. A bit like guerrilla warfare as it is low cost. Drones are dispensable, off the shelf commercial technology can be used.

2. Autonomous drone systems separate the big boys from the rest. A study in the USAF found that remote drone piloting for long hours induces fatigue. Fatigue leads to suboptimal performance. Fire and forget autonomous drone systems are therefore huge force multipliers.

3. Real-time systems using AI for navigation and guidance, coordination, self-healing, target identification and acquisition & munition delivery systems are therefore a strategic asset.

Jyoti Sinha, CTO at Omnipresent Robot Technologies Pvt. Ltd, explains how DRDO's demonstration is significant. Omnipresent leverages and augments its experience of working on DARPA LANdroid programme to develop palm size ground swarm robots while working in the US.

"I congratulate DRDO for developing the first fully functional swarm drone network for tactical and real time support to our armed forces. We would be happy to collaborate with DRDO and leverage our experience of swarm robotics where we have extensively tried to provide solutions to the swarm formation, ad hoc network and drone autonomy piece."

She adds, "In tactical warfare, AI powered swarm drones can carry out simultaneous destruction and dismantling of multiple targets using precise swarm configurations and hover localisation even when less sophistication is available with guided defence equipment. In other situations, it can even be an 'omni-directional attack' where the swarm drones can target one attack from numerous angles. While targeting enemy frontlines, even if some of the drones are attacked, the cognitive AI algorithms kick in and reconfigure the drone network positioning to maintain situational awareness and aid in completion of mission. Using AI, any individual drones in a swarm network can be trained to operate in offensive or defensive mode by switching roles such as decoy, sensor, attacker or just communicator depending upon its positioning and remaining resources."

(Bhargav is an ex-IAF officer from the Aeronautical Engineering (Electronics) branch, and is now an M&A adviser for tech companies. Aweek Sen is an independent journalist working on cyber security and the geopolitics of India's neighbourhood, focussing on Pakistan, Afghanistan, Iran and Bangladesh.

<https://www.dailypioneer.com/2021/sunday-edition/ai-powered-drone-new-tool-of-warfare.html>

Modi bats for Ladakhi apple

Modi has come forward as a brand ambassador for the Ladakhi apple by tweeting; “If you get the opportunity, do taste the organic apples from Ladakh. They are delicious!”.

Jammu: “They are delicious,” tweeted Prime Minister Narendra Modi as the first consignment of organic Ladakhi apple was flagged off from Leh for various destinations in the country.

Modi has come forward as a brand ambassador for the Ladakhi apple by tweeting; “If you get the opportunity, do taste the organic apples from Ladakh. They are delicious!”.

The Chairman, Leh’s Ladakh Autonomous Hill Development Council (LAHDC), Tashi Gyalson, flagged off the first consignment of organic Ladakhi Apples from Leh said an official spokesman on Sunday.



Executive Councillor for Horticulture, Ghulam Mehdi Ashoor, Councillor Tiger, Rigzin Lundup, officials of Horticulture Department led by Chief Horticulture Officer Leh, and representatives from Himalayan Ladakh Agro Products was present on the occasion.

Gyalson stated that the initiative has been successful only because of the collective effort from the local entrepreneurs with the support from local farmers especially from the Nubra region; the concerned Councillor of Tiger and the local administration.

He said there were fewer markets for local agro-products of Ladakh in the previous years but now, such initiatives will definitely pave ways for the farmers and entrepreneurs to explore more opportunities and promote organic products at both national and international markets.

These organic Ladakhi Apples will be shipped to New Delhi, Hyderabad, Tamil Nadu, Kerala and Karnataka.

Ladakh MP Jamyang Tsering Namgyal thanked the PM for promoting Ladakhi apple. He tweeted; “History Created by #ModiSarkar. Organic Apples of Ladakh now available across stores in India”.

In the Ladakh region, apple is an important fruit crop next only to apricot. The fruit is grown at a height of 12,000 ft and the exotic high yielding variety has widely been accepted by the farmers.

DRDO’s Defence Institute of High Altitude Research (DIHAR) is playing an important role in improving the variety of native fruit in Ladakh.

<https://www.thestatesman.com/india/modi-bats-ladakhi-apple-1503027125.html>

[Exclusive] India, Russia likely to sign 10-year military-technical agreement during Putin's visit to India

India and Russia have already worked on the Rs 5,200 crore Kalashnikov deal. This will involve the manufacture of 6.01 lakh AK-203 assault rifles in Uttar Pradesh for the armed forces.

By Srinjoy Chowdhury

New Delhi: A 10-year military-technical agreement between India and Russia is likely to be signed when President Vladimir Putin is in New Delhi early next month.

The agreement could help in the transfer of new-age technologies to India right up to 2031. This could be of great help the Defence Research and Development Organisation, for example, to work on futuristic weapons systems.

Several major agreements could happen during the Putin visit, scheduled for December 6. A memorandum of agreement between the Indian and Russian navies is expected. This is likely to be on "general cooperation, which could increase more exercises and intelligence sharing.

Russia has loaned nuclear-powered submarines to India. After the first INS Chakra in the 1980s, the Russians loaned an Akula-class nuclear powered submarine in 2011. Negotiations for a second submarine are underway. Russia has also offered a third one as well.

The Reciprocal Exchange of Logistics Agreement or (RELOS) is ready to be signed. It will allow India and Russia to use each other's naval and air bases with too many formalities. India has similar agreements with other countries including the USA

India and Russia have already worked on the Rs 5,200 crore Kalashnikov deal. This will involve the manufacture of 6.01 lakh AK-203 assault rifles in Uttar Pradesh for the armed forces.

While Putin and Prime Minister Narendra Modi will meet face to face for the first time since 2019, the big moment will also be the first 2+2 meeting with Russia, where defence minister Rajnath Singh, and external affairs minister S. Jaishankar will interact with foreign minister Sergey Lavrov and defence minister Sergey Shoigu.

India has had 2+2 meetings with only three other countries: the United States of America, Australia and Japan. A meeting with the USA is due and is likely to happen in Washington DC. The dates are being worked out.

<https://www.timesnownews.com/india/article/exclusive-india-russia-likely-to-sign-10-year-military-technical-agreement-during-putin-s-visit-to-india/835865>



Russian President Vladimir Putin (File photo) | Photo Credit: AP

Morocco looks to acquire Indian-Israeli Air Defense System that ‘Shot Down’ Russian ballistic missile near Baku

By Ayush Jain

Israel and Morocco recently signed a landmark defense agreement, a major milestone following the normalization of ties after the Abraham Accords. The agreement laid the foundation of security cooperation, intelligence sharing and arms sales in the future during the Israeli Defence Minister’s visit to Rabat.



Vertical launch with the BARAK LRAD long-range robust interceptor

“The agreement that we signed will allow us to cooperate, with exercises, with information — this is an agreement that will allow us to assist them with whatever they need from us, in accordance — of course — with our own interests. We have a strategic alliance of knowledge,” said Zohar Palti, the head of the Israeli Defense Ministry’s Political-Military Bureau.

While Israel and Morocco do not share common threats, Rabat is engulfed with many issues including separatism in Western Sahara, and conflict with Algeria.

Salah Goudjil, the Algerian Senate Chief and second only to the President, stated that this agreement shows “enemies are mobilizing” to undermine Algeria.

Apart from regional politics, Rabat and Jerusalem do have a common ground in the fight against terrorism emanating from the Middle East and North Africa. It is also believed that Iran and Hezbollah are also involved to some extent in the Algerian-Moroccan conflict.

Morocco established relations with Israel last year, after agreeing to the US-backed Abraham Accords. In exchange, Washington agreed to recognize disputed Western Sahara as part of Morocco.

Major Arms Sales

Rabat has repeatedly expressed its interest in purchasing Israeli weapon systems, especially air defense equipment, radars, and upgrades to combat aircraft.

According to the Israeli Channel 2 News, the Moroccan officials provided Gantz with a ‘wish list’ of weapons systems they want to acquire. This ‘list’ reportedly includes Unmanned Aerial Vehicles, Elta-made Radars, Iron Dome air defense system, and SkyLock anti-drone systems. The kingdom also wants Israeli help to modernize its aging fleet of F-5 light fighter aircraft.

The Moroccan Armed Forces have already acquired some SkyLock systems recently and spent around \$48 million to buy three IAI Heron reconnaissance drones to combat extremism in the Western Sahara region.

Barak-8 Missile

“The agreement that we signed has created a work plan. A steering committee will be set up — led by the Defense Ministry, with the Israel Defense Forces and other organizations participating — that will operate throughout the year in order to advance our shared interests. There will soon be military delegations that will come [to Morocco], and I expect joint exercises,” a senior Israeli defense official, speaking on condition of anonymity, told TheTimesOfIsrael.

One of the most notable deals reported is of Barak-8 surface-to-air missiles, jointly developed by Israel and India.

The Barak-8 can be employed against all types of airborne threats including helicopters, fixed-wing aircraft, unmanned aerial vehicles, anti-ship missiles, ballistic missiles, and cruise missiles, and can hit targets with pinpoint accuracy up to 70 kilometers.

The missile's development was undertaken by Israel Aerospace Industries (IAI), India's Defence Research & Development Organisation (DRDO), Israel's Directorate of Research and Development (DDR&D), Elta Systems, and Rafael Advanced Defense Systems.

The main organizations involved in the production of the missiles are KRAS (a joint venture between Rafael and Kalyani group) and Bharat Dynamics Limited.

Following the successful development, IAI moved on with a new Barak-MX multi-layered air defense system that employs different missiles for different ranges of interception, similar to the Russian S-400 Triumf air defense system.

The MX version provides a single integrated solution for multiple, simultaneous aerial threats from different sources and different ranges, according to the IAI.

"BARAK MX allows you to tailor your system configuration to face any threat, in any mission and in any battle condition. Connect and utilize any combination of the three BARAK MX components," IAI mentions, about the versatility of the system.

The Barak-8 missile has been a significant step in boosting Indian and Israeli air defense capabilities. In operational roles, Barak-8 has shown outstanding success when it reportedly shot down a Russian-made Iskander short-range ballistic missile during the Nagorno-Karabakh conflict in 2020.

During the deadly conflict, Yerevan allegedly fired an Iskander missile directly targeting Baku, which was shot down by a Barak-8 missile operated by Azeri forces.

The land-based system used by the Indian Army and the Air Force is known as MR-SAM, and an extended-range system is being developed, known as LR-SAM.

When coupled with modern multi-function radars like those on naval warships or other air defense radars, Barak-8 can be used to simultaneously engage multiple targets, defending the ship or an installation against saturation attacks.

<https://eurasianimes.com/morocco-acquire-indian-israeli-air-defense-system-russian-iskander-missile/>

India, Israel aim to boost ties through defence tech, trade

By Nikkei

New Delhi: India and Israel are pushing to strengthen ties by deepening cooperation in the fields of defence and information technology, as well as resuming long-stalled negotiations over a free trade agreement.

That comes as New Delhi looks to access Israel's advanced military technology and to indirectly reinforce its relationship with Washington, a close ally to Israel. In turn, Israel hopes to unlock huge new markets for its companies.

The Defense Research and Development Organization of India and Israel's Directorate of Defense Research and Development signed a bilateral agreement earlier this month to promote the development of technologies for both military and commercial use.

Under the move, Indian and Israeli startups will work together on tech such as small unmanned aircraft and artificial intelligence.

That follows an October agreement between Indian External Affairs Minister Subrahmanyam Jaishankar and Israeli Foreign Affairs Minister Yair Lapid aiming to complete a bilateral FTA by June 2022.

Negotiations originally started in 2010, but have long been suspended. Now, for the first time, the two governments have specified a target date for concluding the deal.

The bilateral FTA would enable the two countries to promote the development of IT-based technological innovations on top of India's access to Israel's advanced weaponry, said Somdeep Sen, associate professor in international development studies at Roskilde University in Denmark.

"Israel has proven itself as a reliable supplier of high-quality military hardware and is willing to do so without any political preconditions," Sen added.

India's trade with Israel has totalled US\$3.5 billion so far in 2021, with electrical equipment, jewellery and energy at the heart of business between the nations.

On the defence front, Israel is India's fourth-largest arms supplier, having exported arms worth US\$2.7 billion to the country between 2011 and 2020, according to Stockholm International Peace Research Institute.

In Israel, young people have been starting their own businesses, especially in the fields of cybersecurity and AI, utilising their experience and personal relations nurtured during military service.

The defence industry has developed through cooperation between the military and private sectors, with weapons, such as an air defence system called Iron Dome, proving highly effective in combat.

India is already a large importer of weapons from Israel. But beyond the defence industry, Israel hopes India will be a big market for its companies in sectors such as health care and agricultural technology.

India has concluded FTAs mainly with Asian countries including Japan. Starting in May, however, it announced the launch of negotiations with the UK, the European Union and Australia.

The crisis in Afghanistan has been a key factor in prodding India to begin full-fledged efforts to diversify its diplomacy and approach the Middle East.



Under the move, startups will work together on tech such as small unmanned aircraft and artificial intelligence. (AP pic)

Worries over terrorism have been looming over India's border areas since Afghanistan fell back under the control of the Taliban in August. And the Islamic militant group appears to have been getting in step with Pakistan and China's often hostile stances toward India.

Israel is known for formidable anti-terrorism measures, making it a potentially appealing partner for India.

Israel also maintains close ties with the US and exerts a considerable amount of influence on Washington. India thus hopes to deepen its relationship with the US by strengthening its ties with Israel.

In October, Jaishankar held a meeting with Sheikh Abdallah bin Zayed, the foreign affairs minister of the UAE, US Secretary of State Antony Blinken and Lapid.

Indian media described the meeting as a step toward establishing a "new Quad", following the Quadrilateral Security Dialogue between Japan, the US, India and Australia.

The reinforcement of relations between the US and India is opening the way to establishing a base of cooperation in the Middle East, Harsh Pant of the Observer Research Foundation, an independent think tank in New Delhi, said in reference to the framework formed by the US, India, Israel and the UAE.

The "new Quad" reflects "the changing trajectory of India's diplomatic profile in the region", he added.

Israel normalised its diplomatic relations with the UAE in 2020 through the mediation of the US. India's participation in the new framework is expected to enhance the new ties between the UAE and Israel.

An Israeli diplomatic source said Israel and the UAE "can link (even more deeply) between the US and India", a development that creates "win-win-win" relations for all parties.

<https://www.freemalaysiatoday.com/category/business/2021/11/28/india-israel-aim-to-boost-ties-through-defence-tech-trade>

As F-35 remains elusive, will Indian, UAE Air Forces be the first operators of Russia's New Stealth Fighter Jet?

By Shreya Mundhra

The UAE, whose agreement for the F-35 stealth fighter with the US remains uncertain, has reportedly shown keen interest in Russia's newest warplane, the Su-75 Checkmate while experts debate whether India could be a potential buyer.

Russia showcased this fifth-generation combat aircraft at the Dubai Airshow earlier this month. Besides the Middle East, Moscow is looking to market the Sukhoi-built warplane to India, Vietnam, and African countries.



The Lockheed Martin F-35 stealth fighter.

The F-35 Agreement

The UAE has a \$23 billion agreement with the US to procure Lockheed Martin stealth fighters and other weaponry. The promise of 50 F-35 Lightning II aircraft is a major chunk of this deal.

However, the finalization of the contract is dependent on Abu Dhabi's involvement in the Yemen conflict. The potential impact of the deal on Israel, a key customer of F-35 jets, is also being evaluated.

According to US legislation passed in 2008, Washington would assist Israel in maintaining its Qualitative Military Edge (QME), which means that Israeli forces will have superior military systems capable of defeating any credible traditional threat posed by any state, coalition, or non-state actor in the Middle East.

Additionally, it has been reported that the Biden administration, reflecting concerns about the UAE's relationship with China, has added another condition — that the Gulf state terminates its 5G contract with controversial Chinese technology firm Huawei, which has been accused of corporate espionage by the US and seen as a security threat.

Amid such uncertainties, Abu Dhabi has expressed interest in Russia's Su-75. Speaking at the Dubai Airshow 2021, Sergei Chemezov, head of Russia's state defense and tech corporation Rostec, said that representatives of the UAE have shown interest in the single-engine Su-75 Checkmate light tactical fighter developed by Sukhoi, and want to have a closer look at it.

During a press briefing, Viktor Kladov, who leads Rostec's international cooperation and regional policy department, told reporters that the firm had held talks at the show with the Tawazun Economic Council, Mubadala Investment Company, and Edge Group about the production of telecommunications technology and composite materials. He cited Abu Dhabi's "keen interest" in upcoming tech as the reason behind choosing this Gulf state to co-produce the aircraft.

This is not the first time that Russia and the UAE have worked with the idea of cooperating in the military sector. At the 2017 UAE defense show IDEX, Moscow had declared that Rostec would co-develop a fifth-generation light combat fighter with Abu Dhabi.

Company officials did not provide a clear statement confirming or denying the speculation that the Checkmate is a result of this agreement.

Reuters quoted that Jean-Loup Samaan, a senior research fellow with the Middle East Institute at the National University of Singapore, as saying that "[t]he UAE likes the idea of cultivating ties with the Russian defense industry but it's mainly a way to send a message to the US."

Meanwhile, Klodov revealed bigger plans for the aircraft in the near future. “We foresee that maybe in five years, we have the unmanned version of Checkmate controlled by artificial intelligence,” he told reporters.

Export Plans For Su-75

Commenting on the aircraft’s qualities that make it suitable for other countries to buy, Zhemezov said, “[w]e have one major advantage compared to all the other [foreign] aircraft.

First of all, this is an open configuration plane: we are offering a platform that can carry any armaments that the customer may wish. Besides, we outfit it with various electronics, electronic warfare systems, target acquisition capabilities, and so on.”

“We offer the options that are available and have been tested on the Su-57. These systems have been developed and tested and they have proven their efficiency and thus they are simpler and cheaper,” the Rostec chief said, in the context of foreign armaments that have to be adapted to the Russian warplane.

“And, of course, the price will vary, depending on these options. I hope that the baseline price will be around \$30-35 million,” he added.

Along with the cost, the aircraft’s production timeline was also announced at the Dubai Airshow. While the first flight of the warplane is planned for 2023, its serial production is slated to begin in 2026, Yury Slyusar, the general director of United Aircraft Corporation (UAC), which manufactures Sukhoi jets, confirmed.

In addition to advanced characteristics such as stealth characteristics and supersonic cruising speeds that are required of every fifth-generation fighter, the corporation claims that the new design will also include innovative technologies, especially artificial intelligence (AI) features to assist the pilot.

The firm also claims that this aircraft has been designed to reduce service costs and be easily adapted to the different needs customer countries have.

This is an improvement since Sukhoi, as well as Russia’s MiG aircraft-makers, has only produced twin-engine fighters since the 1980s.

Some experts believe that this has been disadvantageous to Moscow in certain foreign markets where cheaper single-engine aircraft are preferred by customers. With Checkmate, Russia plans to change this trend and hence, a major emphasis on its export.

Yury Borisov, the Deputy Prime Minister of Russia, told Zvezda TV, “First of all, it will indeed be oriented towards African countries, India and Vietnam. The demand for these aircraft is quite high, it is estimated at least 300 aircraft in the near future.”

Will India Buy Checkmate?

While the jet may be pitched to India, a potential deal with New Delhi remains doubtful, The Week quoted Justin Bronk, a research fellow at the British think tank Royal United Services Institute (RUSI).

Bronk, in a chat with aviation magazine Hush-Kit, had expressed his skepticism about India being interested in the Checkmate fighter.

“India is likely to be very wary after its experiences with the PAK FA/FGFA program and poor support for the Su-30MKI fleet post-acquisition,” he was quoted as saying.

PAK FA, the project that developed the Su-57 fighter, was originally supposed to involve India and Russia. This was to be called the Fifth-Generation Fighter Aircraft (FGFA). However, in 2018, India decided to pull out of the project due to the Indian Air Force’s reported concerns regarding the stealth features and engines of the Su-57.

Other than this somewhat bitter experience, the cost is another obstacle between India and the Checkmate. Most major stealth fighter projects have seen extensive cost overruns and development delays in their development.

Along with potential cost overruns and probable difficulties in development, the IAF will also have to factor in India’s indigenous projects currently in development, including the single-engine

HAL Tejas Mark-2, also called Medium Weight Fighter (MWF), and the Advanced Medium Combat Aircraft (AMCA) programs.

Former IAF chief RKS Bhadauria had said that the service was supporting the AMCA, which is scheduled to make its first flight by 2025-26.

“They [DRDO] are looking at a timeline of 2027 to 2030 to put the stealth fighter into production. If that materializes, the fighter should be operationally available to IAF as a squadron by 2032,” Bhadauria told Hindustan Times.

He had further added that the IAF was keen on the integration of sixth-generation technologies into the AMCA. Currently, the Checkmate does not seem to have enough time to be ready to compete for the IAF’s requirement to buy 114 combat aircraft.

However, a top Indian defense analyst told the EurAsian Times that there is a high possibility of India acquiring the Checkmate, explaining that this will not impact the development of the AMCA jet.

Abhijit Iyer-Mitra, a senior fellow at the Institute of Peace and Conflict Studies (IPCS) said – India’s plan to acquire a single-engine jet has been on the anvil for nearly two decades. The MMRCA tender was for a single-engine jet but was later diverted as the Su-30s were not performing well and India wanted another twin-engine jet.

“The second time they did it again with MMRCA 2.0 because Russians did not have a single-engine jet to offer. “Now that the Russians have a single-engine jet, they could enter it into the new competition and I personally feel it stands a really good chance to win the Indian contract,” Iyer-Mitra added.

The only other option that New Delhi has is the American F-35 but it has not been offered yet and is unlikely to be offered as India is set to deploy S-400 missiles. This leaves India with the Checkmate given it is the only visually stealth aircraft which we’ll have access to for a very long time,” he said.

<https://eurasianimes.com/f-35-elusive-indian-uae-first-operators-of-russia-new-stealth-fighters/>



Mon, 29 Nov 2021

जम्मू कश्मीर में फिर से खुलेगा डीआरडीओ का अस्पताल, कोरोना के नए वैरिएंट पर सतर्क हुआ प्रशासन

भगवती नगर स्थित डीआरडीओ के अस्पताल को भी सोमवार से फिर से पहले की तरह शुरू किया जा रहा है। वापस बुलाए स्टाफ को फिर से अस्पताल में भेजा जा रहा है। अस्पताल में नई सिटी स्कैन मशीन भी लगाई गई है।

By Lokesh Chandra Mishra

जम्मू: कई देशों में कोरोना के नए वैरिएंट आमिक्रान के मिलने के बाद जम्मू-कश्मीर भी अलर्ट हो गया है। केंद्रीय सचिव राजेश भूषण द्वारा सभी राज्यों व केंद्र शासित प्रदेशों के मुख्य सचिवों को पत्र लिखने के बाद प्रशासन सतर्क हो गया है। वहीं भगवती नगर स्थित डीआरडीओ के अस्पताल को भी सोमवार से फिर से पहले की तरह शुरू किया जा रहा है। वापस बुलाए स्टाफ को फिर से अस्पताल में भेजा जा रहा है। अस्पताल में नई सिटी स्कैन मशीन भी लगाई गई है।



जम्मू-कश्मीर में पिछले कुछ सप्ताह से कोरोना संक्रमण के मामले बढ़े हैं। कश्मीर में जहां श्रीनगर, बारामुला, बडगाम जिलों में मामले बढ़े हैं। वहीं जम्मू जिले में भी मामले बढ़े हैं। यही नहीं इस महीने अभी तक 41 कोरोना संक्रमित मरीजों की मौत हो चुकी है। यह पिछले महीने की अपेक्षा चार गुणा अधिक है। हालांकि अभी मरीज अस्पतालों में कम ही आ रहे हैं, लेकिन इससे स्वास्थ्य विभाग एक बार फिर से सुविधाओं में विस्तार कर रहा है। 500 बिस्तरों की क्षमता वाले बंद पड़े डीआरडीओ अस्पताल को फिर से शुरू किया जा रहा है। अस्पताल के मेडिकल सुपरिटेण्डेंट डा. नरेंद्र भूटियाल ने भी इसकी पुष्टि की है। उनका कहना है कि सोमवार से फिर से सभी स्टाफ सदस्य वापस आ रहे हैं।

इस बार डीआरडीओ के अस्पताल में सिटी स्कैन की सुविधा भी है। एक सप्ताह तक इस मशीन का ट्रायल होगा और इसके बाद इसे रूटीन में मरीजों के टेस्ट के लिए शुरू कर दिया जाएगा। इस अस्पताल में 125 बिस्तर आइसीयू के हैं। यही नहीं आक्सीजन जनरेशन प्लांट भी लगाया गया है। इसके अलावा लोगों को कोविड से जागरूक करने के लिए भी अभियान चलाया जा रहा है। प्रशासन ने कोविड उपयुक्त व्यवहार को लागू करने के अलावा बाहर से आने वाले लोगों पर विशेष नजर रखने को कहा है। विशेषतौर पर हवाई मार्ग से आने वालों की पहले की तरहही स्क्रीनिंग होगी ताकि जम्मू-कश्मीर में नए वैरिएंट को रोका जा सके।

<https://www.jagran.com/jammu-and-kashmir/jammu-drdo-hospital-to-reopen-in-jammu-and-kashmir-22247494.html>

Defence Strategic: National/International



Press Information Bureau
Government of India

Ministry of Defence

Fri, 26 Nov 2021 5:03PM

Army Chief visits Jaisalmer to review exercise Dakshin Shakti

General Manoj Mukund Naravane, Chief of Army Staff concluded a two day visit to an exercise location in Jaisalmer (Rajasthan) today. During the visit, the Army Chief reviewed Exercise Dakshin Shakti which was conducted by the Southern Command of Indian Army with an aim to ensure integrated application of forces in Multi Domain Operations and upholding the Nation's military aims over the entire spectrum of conflict.

During the past one week, units and formations of the Indian Army practiced tactical and operational manoeuvres by its Infantry, Mechanised Formations and Airborne troops in a fluid battlefield environment, operationalising future technologies. This was effected by exploiting versatile and indigenous airborne platforms such as Advanced Light Helicopter (Weapon System Integrated), Swarm Drones and enmeshing Artificial Intelligence to provide a cohesive operational and intelligence picture amalgamated within the Intelligence, Surveillance and Recce (ISR) Architecture.

A formidable display of the same including Special Heliborne Operations, Swarm Drone and ALH Manoeuvres and coordinated action by ground troops were also practiced. The Army Chief commended the Southern Command for fielding and exploiting the capabilities of indigenous equipment inducted as part of the 'Atma Nirbhar Bharat' initiative. He also emphasised the need to constantly evolve tactics, techniques and procedure to fight "Future Wars" as well as capability enhancement in Manned and Unmanned systems.

The COAS complimented all the participants for the high state of readiness and operational preparedness and exhorted them to continue their vigil for the security of the Nation.



<https://pib.gov.in/PressReleasePage.aspx?PRID=1775333>



Fri, 26 Nov 2021 5:03PM

सेना प्रमुख ने जैसलमेर का दौरा कर अभ्यास दक्षिण शक्ति की समीक्षा की

थल सेना प्रमुख जनरल मनोज मुकुंद नरवणे ने आज जैसलमेर (राजस्थान) में एक युद्धाभ्यास वाले स्थान पर अपने दो दिवसीय दौरे को समाप्त किया। इस यात्रा के दौरान सेना प्रमुख ने अभ्यास दक्षिण शक्ति की समीक्षा की जो भारतीय सेना के दक्षिणी कमान द्वारा बहुआयामी ऑपरेशन में सैन्य बलों का एकीकृत इस्तेमाल सुनिश्चित करने और किसी युद्ध के समस्त आयामों और स्वरूपों पर देश सैन्य उद्देश्यों की प्राप्ति के अभ्यास हेतु आयोजित किया गया था।

पिछले एक सप्ताह के दौरान भारतीय सेना की इकाइयों और संरचनाओं ने अपनी इन्फैंट्री, मैकेनाइज्ड फॉर्मेशन और एयरबोर्न सैनिकों द्वारा एक सक्रिय युद्ध क्षेत्र के वातावरण में, भविष्य की तकनीकों का उपयोग करते हुए सामरिक व अभियानगत युद्ध का अभ्यास किया। यह एडवांस्ड लाइट हेलीकॉप्टर (वीपन सिस्टम इंटीग्रेटेड), स्वार्म ड्रोन और आर्टिफिशियल इंटेलिजेंस जैसे बहुमुखी और स्वदेशी हवाई प्लेटफार्मों का उपयोग कर इंटेलिजेंस, निगरानी और रेकी (आईएसआर) ढांचे में रहते हुए सैन्य अभियानों की समेकित अभियानगत तथा खुफिया तस्वीर प्रदान करने के लिए किया गया था।

विशेष हेलिबोर्न ऑपरेशंस, स्वार्म ड्रोन और एएलएच युद्धाभ्यास सहित इन परिस्थितियों का एक शानदार प्रदर्शन और जमीनी सैनिकों द्वारा समन्वित कार्रवाई का भी अभ्यास किया गया। सेना प्रमुख ने 'आत्मनिर्भर भारत' पहल के अंतर्गत शामिल स्वदेशी उपकरणों की तैनाती व उनका उपयोग करने के लिए दक्षिणी कमान की सराहना की। उन्होंने "भविष्य के युद्धों" के साथ-साथ मानवयुक्त और मानव रहित प्रणालियों में क्षमता वृद्धि से लड़ने हेतु लगातार रणनीति, तकनीक एवं प्रक्रिया विकसित करने की आवश्यकता पर बल दिया।

सेना प्रमुख ने सभी प्रतिभागियों को उच्च स्तर की तत्परता और अभियानगत तैयारियों के लिए बधाई दी और उन्हें राष्ट्र की सुरक्षा के लिए अपनी नज़र बनाए रखने का आह्वान किया।



<https://pib.gov.in/PressReleasePage.aspx?PRID=1775548>



**Press Information Bureau
Government of India**

Ministry of Defence

Fri, 26 Nov 2021 1:20PM

6th edition of Indo France joint military exercise “EX SHAKTI 2021” culminates in France

6th Edition of biennial Indo - France military exercise “Ex SHAKTI- 2021” culminated on 25 November 2021 after twelve days of intense joint military training, exhibiting their combat power and dominance over the extremist groups in simulated Counter Insurgency / Counter Terrorism environment. The exercise provided opportunity to both the contingents to train in Counter Terrorism operations in joint environment under United Nations charter.

The exercise was conducted in two phases involving combat conditioning and tactical training of Counter Terrorism operations culminating with validation of training in semi urban environment. Both the contingents shared their best operational practices and experiences. The troops of both the Armies developed bonhomie by not only involving in tactical exercises but also rubbing shoulders in sports and cultural activities.

Both the contingents expressed immense satisfaction on the outcome of the exercise, in terms of the standards achieved during the conduct. The exercise proved to be another remarkable milestone towards the pledge of terrorism free world. The exercise has certainly added another dimension to ever enhancing military diplomacy between both the participating countries.



<https://pib.gov.in/PressReleasePage.aspx?PRID=1775269>



पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

Fri, 26 Nov 2021 1:20PM

भारत और फ्रांस के संयुक्त सैन्य अभ्यास 'एक्स शक्ति 2021' का छठा संस्करण फ्रांस में संपन्न हुआ

द्विवार्षिक भारत-फ्रांस सैन्य अभ्यास 'एक्स शक्ति 2021' का छठा संस्करण 12 दिनों के गहन संयुक्त सैन्य प्रशिक्षण के बाद 25 नवंबर, 2021 को संपन्न हुआ। इस सैन्य अभ्यास में कृत्रिम इंसर्जेंसी का मुकाबला करने/आतंकवाद विरोधी माहौल से निपटने में चरमपंथी समूहों पर अपनी युद्ध शक्ति और प्रभुत्व का प्रदर्शन किया गया। इस सैन्य अभ्यास ने दोनों सैन्य टुकड़ियों को संयुक्त राष्ट्र चार्टर के तहत संयुक्त माहौल में आतंकवाद विरोधी अभियानों में प्रशिक्षण प्राप्त करने का अवसर प्रदान किया।

यह अभ्यास दो चरणों में आयोजित किया गया, जिसमें मुकाबले की तैयारी और आतंकवाद विरोधी अभियानों के लिए सामरिक प्रशिक्षण सहित अर्ध शहरी वातावरण में प्रशिक्षण की वैधता भी शामिल थी। दोनों टुकड़ियों ने अपनी सर्वोत्तम परिचालन प्रक्रियाओं और अनुभवों को साझा किया। दोनों सेनाओं की टुकड़ियों ने न केवल सामरिक अभ्यासों में बल्कि खेल और सांस्कृतिक गतिविधियों में भी कंधे से कंधा मिलाकर सद्भाव की भावना को विकसित किया।

दोनों ही सैन्य टुकड़ियों ने इस अभ्यास के दौरान हासिल किए गए मानकों के संदर्भ में इस अभ्यास से अर्जित परिणामों पर संतोष व्यक्त किया। यह अभ्यास विश्व को आतंकवाद से मुक्त करने की शपथ की दिशा में एक और उल्लेखनीय मील का पत्थर साबित हुआ है। इस अभ्यास ने निश्चित रूप से दोनों भागीदार देशों के बीच सैन्य कूटनीति को आगे बढ़ाने में एक अन्य आयाम भी जोड़ा है।



<https://pib.gov.in/PressReleasePage.aspx?PRID=1775324>



Colombo security conclave focused operation between India, Maldives and Sri Lanka

Maiden ‘*Colombo Security Conclave (CSC) Focused Operation*’ is being conducted between the lead Maritime Security Agencies of India, Maldives and Sri Lanka on 27 and 28 November 2021. Ships and aircraft of Indian Navy (*IN*), Maldives National Defence Force (MNDF) and Sri Lankan Navy (SLN) are participating and operating over a vast area in the Exclusive Economic Zones (EEZ) of the three countries in Southern Arabian Sea.

It may be recalled that a trilateral Table Top Exercise (TTX) between *IN*, MNDF and SLN was conducted on 14 and 15 July 2021. The three countries had participated in the 5th Deputy National Security Advisors (NSA) – level meeting of Colombo Security Conclave on 04 August 2021, wherein ways of enhancing maritime security cooperation in the Indian Ocean Region were deliberated upon.

‘*CSC Focused Operation*’ is being conducted with an aim of keeping this vital part of the Indian Ocean Region safe and secure for commercial shipping, international trade and conduct of legitimate maritime activities. Focused Operation would help build understanding and interoperability between the lead maritime security agencies, and facilitate institution of measures to prevent and suppress transnational crimes in the region. It would further enhance the operational synergy by exchange of information and conduct of coordinated operations to handle maritime incidents/ accidents.

The conduct of ‘*CSC Focused Operation*’ exemplifies the deep trilateral engagement between India, Maldives and Sri Lanka, and emphasises their commitment to promote peace, and security in the region.



<https://pib.gov.in/PressReleasePage.aspx?PRID=1775797>



पत्र सूचना कार्यालय
भारत सरकार
रक्षा मंत्रालय

Sun, 28 Nov 2021 12:38PM

भारत, मालदीव और श्रीलंका के बीच कोलंबो सुरक्षा सम्मेलन केंद्रित ऑपरेशन

27 और 28 नवंबर 2021 को भारत, मालदीव और श्रीलंका की प्रमुख समुद्री सुरक्षा एजेंसियों के बीच पहला 'कोलंबो सिक्योरिटी कॉन्क्लेव (सीएससी) केंद्रित ऑपरेशन' का आयोजन किया जा रहा है। भारतीय नौसेना (आईएन), मालदीव राष्ट्रीय रक्षा बल (एमएनडीएफ) और श्रीलंकाई नौसेना (एसएलएन) के जहाज और विमान दक्षिणी अरब सागर में तीनों देशों के विशिष्ट आर्थिक क्षेत्रों (ईईजेड) के बड़े इलाके में इस ऑपरेशन में भाग ले रहे हैं और इसका संचालन कर रहे हैं।

यह गौरतलब है कि आईएन, एमएनडीएफ और एसएलएन के बीच एक त्रिपक्षीय टेबल टॉप अभ्यास (टीटीएक्स) 14 और 15 जुलाई 2021 को आयोजित किया गया था। तीनों देशों ने 04 अगस्त 2021 को कोलंबो सुरक्षा सम्मेलन की 5वीं उप राष्ट्रीय सुरक्षा सलाहकार (एनएसए) स्तरीय बैठक में भाग लिया था जिसमें हिंद महासागर क्षेत्र में समुद्री सुरक्षा सहयोग बढ़ाने के तरीकों पर विचार-विमर्श किया गया।

हिंद महासागर क्षेत्र के इस महत्वपूर्ण हिस्से को वाणिज्यिक नौवहन, अंतर्राष्ट्रीय व्यापार और वैध समुद्री गतिविधियों के संचालन के लिए सुरक्षित रखने के उद्देश्य से 'सीएससी केंद्रित ऑपरेशन' आयोजित किया जा रहा है। केंद्रित ऑपरेशन प्रमुख समुद्री सुरक्षा एजेंसियों के बीच आपसी समझ और पारस्परिकता का निर्माण करने में मदद करेगा और इस क्षेत्र में अंतरराष्ट्रीय अपराधों की रोकथाम और उसको दबाने के लिए संस्थागत उपाय प्रदान करेगा। यह समुद्री घटनाओं/दुर्घटनाओं से निपटने के लिए सूचनाओं के आदान-प्रदान और समन्वित संचालन के जरिए परिचालन तालमेल को और बढ़ाएगा।

'सीएससी केंद्रित ऑपरेशन' का संचालन भारत, मालदीव और श्रीलंका के बीच गहरे त्रिपक्षीय जुड़ाव का उदाहरण है, और इस क्षेत्र में शांति और सुरक्षा को बढ़ावा देने के लिए उनकी प्रतिबद्धता को जाहिर करता है।



<https://pib.gov.in/PressReleasePage.aspx?PRID=1775832>

CDS Bipin Rawat, top Military Commanders brief parliamentary panel on preparedness of armed forces

The agenda of the meeting was a briefing by the Defence Ministry representatives on 'review of strategic operational preparedness of defence forces in view of the current security scenario including border security'.

New Delhi: Chief of Defence Staff Bipin Rawat and top military commanders on Friday briefed a parliamentary panel on the operational preparedness of the armed forces, the panel's chairman Jual Oram said.

Besides Rawat, senior officials of the Defence Ministry and top commanders of the Army, Navy and the Air Force deposed before the Parliamentary Standing Committee on Defence at the Parliament Complex.

The agenda of the meeting was a briefing by the representatives of the Ministry of Defence on 'review of strategic operational preparedness of defence forces in view of the current security scenario including border security'.

Oram said Rawat made a very good presentation on the subject before the panel.

Sources said commanders of all three armed forces made presentations on the operational preparedness of their respected forces. They updated MPs about the recent procurement and additions to their arsenal.

CDS Rawat gave the overall presentation on the preparedness of all three forces and various initiatives taken for development of infrastructure in the border areas, they said.

Around 11 members of the 31-member committee were present at the meeting on Friday. Congress leader Rahul Gandhi was among the absentees.

<https://www.indiatoday.in/india/story/cds-bipin-rawat-top-military-commanders-parliamentary-panel-armed-forces-1881398-2021-11-27>



CDS Bipin Rawat and top military commanders briefed parliamentary panel on operational preparedness of armed forces on Friday. (File Photo)

IAF Chief to embark on 5-day visit to Egypt

The IAF said he is visiting the country to attend the Egypt Air Power Symposium and Egyptian Defence Exposition in Cairo

New Delhi: Chief of Air Staff Air Chief Marshal V.R. Chaudhari will pay a five-day visit to Egypt beginning November 28 which is expected to bolster ties between the two countries.

The Indian Air Force (IAF) said he is visiting the country to attend the Egypt Air Power Symposium and Egyptian Defence Exposition (EDEX) which will take place in Cairo from November 28 to December 2.

"The Chief of Air Staff (CAS) would be attending the air power symposium at the invitation of the Egyptian Air Force commander and deliver a key note address on 'strategic air intelligence in confronting new and non-organised threats' on November 28," the IAF said in a statement.

It said the EDEX is fully supported by the Egyptian armed forces and exposes the attending dignitaries to the latest technology, equipment and systems across land, sea and air through live demos and static displays.

"The visit of CAS is expected to bolster the ties with the Egyptian armed forces. On the sidelines of the visit, the CAS would also be interacting with senior commanders of other armed forces of the world during the exposition," the IAF said.

<https://www.thehindu.com/news/national/iaf-chief-to-embark-on-5-day-visit-to-egypt/article37716477.ece>



File photo. Chief of Air Staff Air Chief Marshal V.R. Chaudhari will pay a five-day visit to Egypt, and is expected to bolster ties between the two countries | Photo Credit: R.V. MOORTHY

नवभारत टाइम्स

इंडियन आर्मी के स्नाइपर्स बनेंगे और ज्यादा

घातक, ट्रेनिंग कोर्स में बड़ा बदलाव

लाइन ऑफ कंट्रोल (LAC) पर तेजी से हालात बदल रहे हैं। पाकिस्तान और चीन दोनों ने खतरा पैदा किया है। उन्होंने अपनी-अपनी स्नाइपिंग कैपेबिलिटी भी बढ़ाई है।

By पूनम पाण्डे, Edited by अमित शुक्ला

हाइलाइट्स

- कोर्स को दो हिस्सों में बांटा गया, बेसिक और अडवांस
- अब दी जाएगी साको टीआरजी स्नाइपर राइफल में ट्रेनिंग
- दुनियाभर में स्पेशल फोर्स कर रही हैं इसी स्नाइपर राइफल का इस्तेमाल

नई दिल्ली: इंडियन आर्मी के स्नाइपर्स (दूर से निशाना लगाने वाले सैनिक) अब और ज्यादा घातक बनेंगे। आर्मी ने स्नाइपर ट्रेनिंग कोर्स में बड़ा बदलाव किया है। साथ ही स्नाइपर ट्रेनिंग कोर्स में अब उस स्नाइपर राइफल पर भी ट्रेनिंग दी जाएगी जिसे दुनियाभर की स्पेशल फोर्स इस्तेमाल कर रही हैं। इंडियन आर्मी अब दुनिया की सबसे भरोसेमंद माने जानी वाली स्नाइपर राइफल साको टीआरजी में ट्रेनिंग देगी।

कुछ वक्त पहले ही आर्मी ने इन्हें खरीदा है। ये स्नाइपर राइफल आर्मी के स्पेशल फोर्स के कमांडो भी इस्तेमाल कर रहे हैं।

बेसिक के साथ अडवांस कोर्स भी

इंडियन आर्मी के एक अधिकारी ने कहा कि लाइन ऑफ कंट्रोल (LAC) पर लगातार ऑपरेशनल डायनामिक्स बदल रहे हैं। पाकिस्तान और चीन ने भी अपनी स्नाइपिंग कैपेबिलिटी बढ़ाई है। पाकिस्तान ने अलग-अलग कैलिबर के राइफल सिस्टम को शामिल कर अपने स्नाइपर ट्रेनिंग प्रोग्राम को सुधारा है। वहीं, चीन ने भी स्नाइपिंग कैपेबिलिटी अपग्रेड की है।



Indo-French Military Exercise में भारतीय सेना ने लगाया दम

चीनी ने अपनी सेना पीएलए की जरूरत को पूरी करने के लिए QBU-88 डोमेस्टिक स्नाइपर राइफल सिस्टम बनाया है। इंडियन आर्मी वक्त-वक्त पर स्नाइपर ट्रेनिंग कोर्स को मॉडिफाई करती रहती है। अब तय किया गया है कि स्नाइपर कोर्स दो तरह का होगा, एक बेसिक और एक अडवांस। दोनों कोर्स का वक्त भी बढ़ाया गया है।

बेसिक कोर्स करने के बाद कुछ चुने हुए स्नाइपर्स को अडवांस कोर्स कराया जाएगा, जिससे भविष्य की चुनौतियों से निपटने के लिए आर्मी की स्नाइपिंग कैपेबिलिटी बढ़ेगी। मऊ के इंफ्रंट्री स्कूल में स्नाइपर्स की ट्रेनिंग होती है। यहां अब इंस्ट्रक्टर (ट्रेनिंग देने वाले अधिकारी) की संख्या भी बढ़ाई गई है।

डेडली स्नाइपर राइफल में ट्रेनिंग

आर्मी अधिकारी के मुताबिक, स्नाइपर ट्रेनिंग के अडवांस कोर्स में स्नाइपर टीम को साको टीआरजी (.338 Sako TRG 42) स्नाइपर राइफल में भी ट्रेनिंग दी जाएगी। इसका वजन बिना बुलेट के करीब 5 किलो है और इसकी इफेक्टिव रेंज 1500 मीटर है। फिनलैंड की इस स्नाइपर राइफल को दुनियाभर में सबसे भरोसेमंद माना जाता है।

यही वजह है कि लगभग हर देश की स्पेशल फोर्स इनका इस्तेमाल कर रही है। अभी इंफ्रंट्री स्कूल में रशियन ड्रैगनॉव (Dragunov) स्नाइपर राइफल पर ट्रेनिंग दी जा रही है। आर्मी के अधिकारी के मुताबिक, हाल ही में खरीदी गई साको टीआरजी स्नाइपर राइफल पर ट्रेनिंग से स्नाइपिंग कैपेबिलिटी बढ़ेगी।

साल में 100 स्नाइपर टीम को ट्रेनिंग

स्नाइपर की ट्रेनिंग के लिए यूनिट और रेजिमेंटल सेंटर से सैनिकों का चयन किया जाता है। इंडियन आर्मी में एक इंफ्रंट्री बटालियन में 10 स्नाइपर टीम अधिकृत हैं। पहले स्नाइपर कोर्स में स्पॉटर की ट्रेनिंग पर ज्यादा फोकस नहीं था, लेकिन कुछ साल पहले इसमें बदलाव किया गया और जोड़े में (स्नाइपर और स्पॉटर) ट्रेनिंग देना शुरू किया गया। अब स्नाइपर और स्पॉटर दोनों को एक साथ ट्रेड किया जा रहा है। इंफ्रंट्री स्कूल में साल में पांच कोर्स होते हैं जिसमें 100 स्नाइपर डिटेचमेंट को ट्रेनिंग मिलती है।

<https://navbharattimes.indiatimes.com/india/indian-army-snipers-will-become-more-lethal-big-change-in-sniper-training-course/articleshow/87967117.cms>

उपलब्धि : स्वदेशी बायोजेट फ्यूल से उड़ान भरेंगे भारतीय वायुसेना के विमान

By शैलेन्द्र सेमवाल

देहरादून: देहरादून स्थित सीएसआईआर-भारतीय पेट्रोलियम संस्थान देहरादून (आईआईपी) के बनाए स्वदेशी बायो-जेट ईंधन को वायु सेना के विमानों में प्रयोग के लिए औपचारिक स्वीकृति मिल गई है। इससे पहले वायुसेना इसका ट्रायल कर चुकी है। अब वायुसेना के विमान बायोजेट फ्यूल से उड़ान भर सकेंगे।



सेना उड़न योग्यता तथा प्रमाणीकरण केंद्र (सीईएमआइएलएसी) के समूह निदेशक आर कमलकन्नन ने अंतरिम प्रमाण-पत्र सीएसआईआर-आईआईपी के प्रधान वैज्ञानिक सलीम अख्तर फारूकी को सौंपा। भारतीय वायुसेना के ग्रुप कैप्टन आशीष श्रीवास्तव और विंग कमांडर ए सचान, सीईएमआइएलएसी के आर शण्मुग्वेल भी उपस्थित थे। यह प्रमाणन विमानन बायोफ्यूल क्षेत्र में भारत के बढ़ते विश्वास और आत्मनिर्भर भारत की ओर महत्वपूर्ण कदम है। यह प्रौद्योगिकी वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद की राष्ट्रीय प्रयोगशाला भारतीय पेट्रोलियम संस्थान (सीएसआईआर-आईआईपी) ने विकसित की है। पिछले तीन वर्षों में इस पर कई प्रायोगिक परीक्षण तथा ट्रायल किए गए हैं। आईआईपी के निदेशक डॉ. अंजन रे ने खुशी जताते हुए बताया कि इस स्वीकृति के बाद भारतीय सेनाएं स्वदेशी प्रौद्योगिकी से निर्मित इस बायोजेट ईंधन का अपने सभी कार्यकारी विमानों में प्रयोग कर पाएंगी। साथ ही बायोजेट के व्यावसायिक उत्पादन में मदद मिलेगी।

सफलतापूर्ण परीक्षण के बाद मिला प्रमाणपत्र

एयरबोर्न सामग्री का परीक्षण एक जटिल और अत्याधिक सतर्कतापूर्ण प्रक्रिया है। इसमें सघन जांच-पड़ताल और परीक्षणों के साथ उच्चतम स्तर की फ्लाइट सेफ्टी को सुनिश्चित किया जाता है। अंतर्राष्ट्रीय विमानन मानक इस कठोर मूल्यांकन को परिभाषित करते हैं। 26 जनवरी 2019 को गणतंत्र दिवस पर बायोजेट ईंधन मिश्रित ईंधनयुक्त सेना के एएन-32 मालवाहक विमान ने राजपथ पर उड़ान भरी थी। इसके बाद 30 जनवरी 2020 को एक रूसी विमान लेह हवाई अड्डे पर सफलता पूर्वक उतरा और उड़ान भरी। इतनी ऊंचाई और अत्याधिक शीत परिस्थितियों में भी बायोजेट ईंधन का यह प्रयोग सफल रहा। इसके अतिरिक्त इस बायोजेट ईंधन का एक और सफल परीक्षण किया गया, जब 27 अगस्त 2018 को बायोजेट ईंधन मिश्रित ईंधन से प्रचालित स्पाइस जेट की सिविल, व्यावसायिक प्रदर्शन उड़ान सफलतापूर्वक दून से दिल्ली पहुंची।

यूज्ड कुकिंग ऑयल से बना फ्यूल

बायोजेट ईंधन का निर्माण प्रयोग किए खाने के तेल, वनस्पति तेल, अल्पकालीन तिलहन फसलों तथा खाद्य तेल प्रसंस्करण इकाई के अवशिष्ट अर्क से किया गया है। पारंपरिक जेट ईंधन की तुलना में गंधक की मात्रा कम होने से वायु प्रदूषण भी कम होता है व भारत के शून्य कार्बन उर्त्सजन के लक्ष्य की प्राप्ति

में सहायता मिलेगी। साथ ही यह अखाद्य तेलों-संग्रह, उत्पादन से जुड़े किसानों तथा आदिवासियों की आजीविका के संवर्धन भी करेगी।

<https://www.livehindustan.com/uttarakhand/dehradun/story-indian-air-force-aircraft-to-fly-with-indigenous-biojet-fuel-5185705.html>



Sat, 27 Nov 2021

Tactical Bombers, dedicated military satellite to give a big boost to Indian Air Force amid border turmoil with China

By Sakshi Tiwari

The Indian Air Force (IAF) is set to get a shot in the arm amid continuing border standoff with China. The service has received the first two Mirage 2000 tactical bombers from France as part of a contract for 24 second-hand aircraft.

Two Mirage 2000 trainer jets arrived in India and joined the rest of the fleet at the Gwalior Airbase. In a separate development, the Ministry of Defense (MoD) has announced the procurement of a GSAT-7C communication satellite for the Indian Air Force.

“The Indian Air Force has received two Mirage 2000 trainer version aircraft from France. The two aircraft were flying with their Air Force and arrived at the Gwalior airbase recently,” government sources told ANI.



An IAF Mirage 2000 fighter jet

In September this year, India had announced that it would acquire two dozen second-hand Mirage 2000 tactical bombers from France. The reason cited for procuring these retired aircraft was that it would bolster the IAF’s aging fourth-generation Mirage fighter fleet.

Tactical bombing is a concept of aerial bombing aimed at targets of immediate and important military value like key defense installations or equipment including missile defense systems, radars or key bases.

Even as this decision drew flak from defense analysts and veterans, it was understood as a decision at smart budgeting and a military imperative to face the threat posed by China in the backdrop of growing tensions at the border.

Mirage is a single-engine, single-seat, air defense, multi-role fighter of French origin. The aircraft was inducted into IAF in 1985.

In another development, the Defense Ministry announced the procurement of a GSAT-7C Communication satellite for the IAF. The decision was taken at a Defense Acquisition Council (DAC) meeting chaired by Defense Minister Rajnath Singh.

The MoD said in a statement that the GSAT-7C satellite and ground hubs for software-defined radios (SDRs) will improve the armed forces’ ability to communicate in a secure manner beyond Line of Sight in all conditions.

Mirage Entry To Bolster Airpower?

The trainer aircraft would now be upgraded to the latest standards as part of the Mirage upgrade program being taken up by the Hindustan Aeronautics Limited (HAL).

The two aircraft were acquired by the IAF as part of the program to make up the number of aircraft in the Mirage fighter fleet to around 50 since a few aircraft were earlier lost to accidents.

“The Indian Air Force has made a wise investment in finding spare parts for the Mirages in the form of retired French aircraft, which will allow the Air Force to sustain them until 2035,” an unnamed official was quoted as saying by ANI.

The Mirage upgrade arrangement between the French and Indian sides was meant to improve the capabilities of 51 jets, but some of the kits have been left-over owing to previous plane crashes. The same kits may now be installed on these two French Air Force planes to make them combat-ready.

In July 2011, the IAF awarded Dassault a contract to upgrade 51 Mirage 2000s to Mirage 2000 I/TI specifications with new avionics and missiles. Dassault was to install numerous equipment on the aircraft. Thales was responsible for the majority of the avionics and systems development, while MBDA was awarded a separate contract to provide and integrate MICA air-to-air missiles.

The first upgraded aircraft with Initial Operational Clearance (IOC) was delivered in 2015 which was then upgraded to Final Operational Clearance (FOC) standards in 2016. However, not much progress has been made in the program after an upgraded variant crashed in 2019.

HAL sources said a fatal accident in February 2019 involving an upgraded Mirage during a test flight, and the subsequent Covid-19 pandemic led to the delay. However, now the two retired aircraft that have been delivered to India will be used to bolster the program.

A new mission computer with more memory, a new radar, enhanced navigation and electronic warfare systems, and advanced communication and identification systems are all part of the upgrade. The planes are also expected to have a major cockpit makeover, including two lateral displays, glass cockpits, and helmet-mounted displays.

This will help India retain one of its most able fighters that proved its mettle in 2019 when it entered the Pakistani airspace and bombed the terrorist hideouts in the Balakot strike. Thereafter, it has made several sorties at the LAC after the conflict with China broke out in eastern Ladakh last year.

New Military Satellite

The GSAT-7C communication satellite system will allow the IAF’s software-defined radios to communicate in real-time. In 2018, the GSAT-7A was inducted to boost military communication. The GSAT-7A is a dedicated communication satellite for the Army and the Air Force.

The GSAT series of geosynchronous communications satellites was designed and manufactured by the Indian Space Research Organisation (ISRO).

It aids the IAF’s communication capabilities. For starters, the satellite enables cross-connectivity between different ground radar stations, airbases, and Air Warning and Combat System aircraft such as the Beriev A-50 Phalcon and the DRDO AEW&CS.

Now with the addition of the GSAT-7C, the IAF’s capability is expected to rise exponentially and the communication is set to become more secure.

Ever since the conflict broke out at the LAC in 2020, India has made a series of weapons upgrades and new purchases to boost the overall military capability. The induction of second-hand Mirage 2000 jets and the integration of SPICE bombs are like to enhance India’s airpower amid the protracted border standoff with China.

<https://eurasianimes.com/mirage-2000-gsat-7c-satellite-to-give-a-big-boost-to-indian-air-force/>

Tsirkon Hypersonic Missile: Russia begins mass production of ‘World’s Fastest’ missile that Putin famously called ‘Invincible’

By Sakshi Tiwari

The Russian Navy will now be armed with Tsirkon/Zircon hypersonic missiles. The move assumes significance amid Moscow’s tensions with NATO and its increased interest in the Indo-Pacific region.

Russia’s Military-Industrial Corporation Research and Industrial Association of Machine-Building (NPO Mashinostroyenia), based in Reutovo near Moscow, have begun serial manufacturing of Tsirkon, also spelled as Zircon, hypersonic missiles for the country’s Navy, reported TASS.

“Serial manufacture of Tsirkon missiles is underway at NPO Mashinostroyenia,” TASS quoted a source as saying, adding, “but state trials of this product’s surface launches will continue.”



The Tsirkon missile (via Twitter)

On November 3, President Vladimir Putin claimed that the Tsirkon hypersonic cruise missile experiments were nearing completion and that the missiles will begin arriving for the Russian Navy next year.

Days later, Defense Minister Sergei Shoigu briefed Putin on a successful test launch of a Tsirkon hypersonic missile in the White Sea.

Flight development testing of the Tsirkon hypersonic missile would continue in 2024 from the Project 885M (Yasen-M) modified nuclear-powered submarine Perm, the aforementioned news agency said.

The Russian nuclear-powered submarine Severodvinsk fired Tsirkon hypersonic missiles for the first time from its surface and submerged positions in the White Sea in October this year.

The modified submarine Perm, which is the fifth nuclear-powered submarine in the Project 885M, will be the first regular underwater carrier of Tsirkon hypersonic missiles. The submarine is scheduled to join the Russian Navy in 2025.

Six Project 885M submarines to be armed with Tsirkons are currently being built at the Sevmash Shipyard, which is part of the United Shipbuilding Corporation.

The Russian Navy’s lead submarines Project 885 and Project 885M, Severodvinsk and Kazan, are in operational service, while the Project 885M first serial-built sub, Novosibirsk, is undergoing trials and is expected to enter service by the end of this year.

Can Tsirkon/Zircon Missile Evade Radars?

The Tsirkon multi-purpose hypersonic missile which is designated to strike sea and ground targets is capable of flying at Mach 9 or nine times the speed of sound, at a range of over 1000 km. It’s worth mentioning that President Putin has termed Tsirkon and other cutting-edge weaponry as “invincible”.

The announcement of mass production of the Tsirkon missile also points to the Russian strategy of deterring its adversaries as it comes in the backdrop of a US warship entering the Black Sea.

It is said that the missile cannot be intercepted even by sophisticated American systems. The reason is that hypersonic weapons, such as Russia’s 3M22 Tsirkon, travel at speeds of more than

Mach 9 and have a low atmospheric-ballistic trajectory, allowing them to bypass typical anti-missile defenses.

The missile uses improved fuel with a range of up to 1,000 km. And it moves so quickly that the air pressure in front of the weapon generates a plasma cloud, which absorbs radio frequencies and renders it virtually invisible to active radar systems.

Russia's move to hypersonic weapons is most likely a response to the US' size, technology, and the sheer number of aircraft carriers. The US Navy wants to maintain a nuclear-powered aircraft carrier force of 12 ships. Russia, on the other hand, has one, and it deploys with a tugboat in case its engine fails.

Even the most modern American aircraft carrier, the USS Gerald R. Ford, could be sunk with less than half a dozen of Tsirkon missiles. The primary reason behind this is that even if a US ship detected a Zircon missile from 100 miles away, it would only have one minute to respond, according to Popular Mechanics.

To intercept a Russian Tsirkon missile, the US would have to intercept it before it was launched or fly something into its route.

Interestingly, the India-Russia joint venture BrahMos-II hypersonic missile would be very similar to the Zircon. "Although India test-fired its first indigenous Hypersonic Technology Demonstrator Vehicle (HSTDV), developed by the Defence Research and Development Organisation (DRDO), in August last year, knowledgeable sources say that this is related to the making of the BrahMos-II, which is supposed to succeed the Indian Navy's BrahMos anti-ship missile," Prakash Nanda, Consulting Editor, The EurAsian Times, previously wrote.

In one of his most bellicose statements in years, Putin promised a slew of new hypersonic weapons, claiming they could target practically any point on the globe and evade a US-built missile shield.

Geopolitical Churning

Because of its speed, the Tsirkon missile would be the fastest in the world, making it nearly hard to defend against. The missile's plasma cloud is also a valuable feature, allowing the weapon to go unnoticed.

This is a valuable addition to the Russian Navy amid a modern-day arms race that includes three participants — the US, Russia, and China. After having unveiled a series of weapon systems that have been acknowledged with caution in the west, Russia has finally started serial production of its most advanced hypersonic missile to be launched from a submarine.

This gives a strategic advantage to the Navy not only its own backwaters but in other strategic waters where it might be deployed to deter a common powerful adversary with the Indo-Pacific being a case in point.

The Russian Navy will be able to improve its combat capabilities in 2022 when the missiles are deployed on warships. This will create deterrence wherever the Russians are deployed.

<https://eurasianimes.com/tsirkon-hypersonic-missile-russia-mass-production-of-worlds-fastest-missile/>

Ahead of S-400 Triumf missile system delivery, China monitors India's defence preparedness

China-based cyber attackers targeting Indian Defence and Power Sector to get information about India's defence preparedness
By Manish Shukla

Highlights

1. **China is monitoring India through satellites, drones**
2. **Russia is delivering the S-400 Triumf surface-to-air missile systems to India**

As the date of delivery of S-400 Triumf surface-to-air missile systems from Russia to India approaches, China's concern is growing. China is constantly monitoring India's defence preparedness and monitoring India through satellites, drones. According to exclusive information accessed by Zee Media, China-based cyber attackers targeting Indian Defence and Power Sector to get information about India's defence preparedness.



File photo

"China-based cyber threat actors targeted Defence, Telecom and Power Sectors. Cyber threat actors were also noticed using compromised Indian computers to access sensitive details," an officer aware of these developments told Zee Media.

As reported by media this month, Russia has started delivering the S-400 Triumf surface-to-air missile systems to India, the deliveries are going as planned, Director of the Federal Service for Military-Technical Cooperation (FSMTC) Dmitry Shugaev told Sputnik ahead of the Dubai Airshow. Russia will deliver the first lot of the S-400 anti-aircraft missile system during Putin's visit to India starting from December 6th.

India has finalised an agreement with Russia to procure a batch of the missile systems at a cost of Rs 40,000 crore. According to sources, a large number of cyber attack cases have been reported from China as well as Pakistan in the last few months. Intelligence agencies are continuously identifying cyber attacks on the country's critical infrastructure sector and sharing information with the Centre as well as states.

"During the period between September 1- September 30, cyber threat intelligence in respect of 40 compromised computers and nearly 100 vulnerable web applications were shared with 20 states and Union Territories. It was found that state police, Cooperative Banks and other Government departments were the main targets of Cyber threat," said a senior security official.

Pakistan-based cyber threat actors targeted Defence and Central Armed Police Forces (CAPFs). As per the report total 11 Computers were found to be compromised in Jammu & Kashmir followed by 7 in Karnataka and 6 in Uttar Pradesh.

It has been reported in the past too that the People's Liberation of Army of China is running a secret unit for cyber espionage and eyeing information related to India's defence and research, According to report People's Liberation of Army (PLA) has intensified its activities against India. Many cases have been reported in the last few months in which Chinese hackers associated with the PLA attempted to gather sensitive information of the country through cyber espionage.

Since 2015, PLA has centralized its space, cyber and electronic warfare (EW) assets in the newly raised PLA Strategic Support Force (PLASSF). Therefore the cyber espionage unit which deals with cyber warfare and was under erstwhile 3 PLA (General Staff Department Third Department) have been subordinated under the network system department of the PLASSF.

<https://zeenews.india.com/india/ahead-of-s-400-triumf-missile-system-delivery-china-monitors-indias-defence-preparedness-2414144.html>

India expresses concerns to China over military buildup opposite Eastern Ladakh

By Ajit K Dubey

There are reasons for concern for the Indian side as the Chinese are building new highways and connecting roads, constructing new habitats and settlements near the LAC

With China investing heavily in upgrading military infrastructure along the Line of Actual Control (LAC), India expressed concerns over the buildup by the People's Liberation Army opposite the Eastern Ladakh sector.

During the talks held recently between the two countries, the Indian side expressed concerns over the buildup by the Chinese Army in areas near the Eastern Ladakh sector, sources told ANI.

Sources said there are reasons for concern for the Indian side as the Chinese are building new highways and connecting roads, constructing new habitats and settlements near the Line of Actual Control and have deployed heavy weaponry including missile regiments on their side.

Sources said the military infrastructure upgrade has been very significant as they are widening highways and new airstrips are being constructed apart from the main bases in Kashgar, Gar Gunsa and Hotan.

A major wide highway is also being developed which will further improve the connectivity of the Chinese military positions on the LAC with the hinterland, they said.

Sources said the Chinese military has also focused on building infrastructure for its air force and army to keep them hidden from the American and other satellites also in the depth areas.

The attempts of recruiting the Tibetans and basing them right at the border posts along with the mainland Han troops are also gaining speed as they want to use the sons of the soil to man the highly difficult terrain where survival has been very tough for the mainland Chinese troops.

Sources said if compared with winters last year, the Chinese are much better prepared in terms of the shelters, road connectivity and acclimatisation.

Rockets and missile regiments have been deployed in rear areas controlled by the PLA in Tibet Autonomous Region, the sources said.

The deployment of drones from the Chinese has gone up significantly as a large number of them have been deployed for surveillance in the sector, they said.

On whether the number of Chinese troops deployed opposite Indian borders has gone up in the recent past, the sources said the Chinese have focused more on capability enhancement in that area.

The Indian side, sources said, is also much more prepared than last year as it has also deployed whatever is required by the forces to deal with any misadventure in the region.

The conflict on the northern borders started after the Chinese Army started behaving aggressively and diverted around 50,000 troops from a summer wargame in the Aksai Chin area to the Indian border which led to the creation of multiple friction points on the LAC.

The Indian side responded at great speed and the Chinese aggression was checked with mirror deployment and other measures.



Chinese military has also focused on building infrastructure for its air force and army to keep them hidden from the American and other satellites also in the depth areas. (AFP)

India has also diverted many of its Pakistan-centric armoured forces towards the high altitude border in areas where tanks can manoeuvre in the cold desert.

The number of formations looking after the highly sensitive border has also gone up and now the entire eastern Ladakh area is covered and protected by the security forces.

A large number of measures have also been taken to strengthen the troops in the fight against the extreme winters and mega airlift exercises have been carried out by the IAF to help further build up the winter stocking for the next six months.

<https://www.livemint.com/news/india/india-expresses-concerns-to-china-over-military-buildup-opposite-eastern-ladakh-11638086100394.html>



Press Information Bureau
Government of India

Ministry of Science & Technology

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First of its kind program for lateral entry for women researchers in joint R&D projects between India and Germany launched

A first-of-its-kind programme to promote women in the field of research and development through lateral entry was launched yesterday. The programme called Women's Involvement in Science and Engineering Research (WISER) program was launched by Indo-German Science & Technology Centre (IGSTC) for encouraging women researchers in joint R&D projects.

Mr. SK Varshney, Indian co-chair and Head, International Cooperation Division, DST, pointed out that WISER will enable gender equality and women's participation in Science and Technology through IGSTC's program.



Speaking on behalf of German co-chair and German Education & Research Ministry, Dr. Ulrike Wolters, Member Secretary, IGSTC/BMBF, said that this programme will be in addition to the ongoing flagship 2+2 program of the Centre.

This program by IGSTC, a joint initiative of the Department of Science and Technology (DST), Government of India and the Federal Ministry of Education and Research (BMBF), Government of Germany, will support women scientists holding regular/long term research positions in academia or research institutes/industry. The involvement in the program will be possible through lateral entry. There is neither requirement of break-in-career nor any age limit, and it will enable easy participation.

IGSTC is going to support the awardees with a maximum amounting to Rs. 39 L from the Indian side & € 48000 from the German side. WISER program offers 20 awards per year.

The program was launched in the presence of eminent woman scientists from both countries. From Indian side, Dr. Tessy Thomas, DRDO, and Dr. Muthayya Vanitha, ISRO, welcomed and appraised the program. From the German side, Dr. Nicola Marsden, University of Applied Sciences Heilbronn, and Petra Lucht, Technical University Berlin, explained the need of such programs for enabling woman participation in the science and technology. Dr. Nisha Mehndiratta, Head WISE-KIRAN, DST, was also present at the launch.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1775314>

Isro's Gaganyaan missions set to resume next year

A module developed under the Samudrayaan mission of the Ministry of Earth Sciences was submerged to 600 metres depth off the Chennai coast in October end

By Anonna Dutt

New Delhi: The two unmanned flights under the Gaganyaan mission will happen next year with the first as soon as January, said Union minister of state for the department of space Dr Jitendra Singh. The third, carrying an Indian crew will happen in 2023, the minister added.

India's first manned flight was originally scheduled to happen before India completed 75 years of Independence on August 15, 2022 as announced by Prime Minister Narendra Modi in 2018, but the mission was delayed by the coronavirus pandemic which affected the manufacturing and testing of systems and subsystems as well as the training of the crew (in Russia).

Singh is hoping that the manned flight coincides with the country's deep-sea mission. "The timing should be such that we send a man to space just as we send a man 5,000 metres down in the ocean. The deep ocean exploration mission was running a little behind, but now it has caught up and we have already tested a module," said Singh.

A module developed under the Samudrayaan mission of the Ministry of Earth Sciences was submerged to 600 metres depth off the Chennai coast in October end. An unmanned module will first be tested at the depth of over 5,000 metres before humans are sent in it.

"Our unmanned vehicle is now ready to go. Around a year or year-and-a-half after the unmanned mission we will be ready to send humans," the minister said.

This declaration comes even as the Indian Space Research Organisation (Isro) has been lagging behind on its routine launches such as that of earth observation satellites on account of the pandemic. India has conducted only four launch missions in the last two years. In comparison, China has conducted at least 40 missions this year itself, setting a global record.

All of Isro's big ticket missions such as the launch of the first solar mission Aditya L-1, space observatory XPoSat, and the third lunar mission Chandrayaan-3 have been deferred. As HT reported earlier, the space agency is unlikely to finish the three missions – two Polar Satellite Launch Vehicle (PSLV) and one Small Satellite Launch Vehicle (SSLV) mission carrying earth observation satellites – that were planned for this year after the second wave of the pandemic.

<https://www.hindustantimes.com/india-news/isros-gaganyaan-missions-set-to-resume-next-year-101637951386637.html>



An unmanned module will first be tested at the depth of over 5,000 metres before humans are sent in it.(PTI File Photo)

ISRO के अंतरिक्ष अभियान पकड़ेंगे रफ्तार!

2022 से फिर शुरू होगा गगनयान मिशन

पृथ्वी विज्ञान मंत्रालय (Ministry of Earth Sciences) के समुद्रयान मिशन (Samudrayaan mission) के तहत तैयार किए गए मॉड्यूल को अक्टूबर में 600 मीटर की गहराई में डुबोया गया था। 5 हजार मीटर की गहराई तक इंसान को भेजने से पहले मानवरहित मॉड्यूल की जांच की जाएगी। सिंह ने कहा, 'हमारा मानवरहित वाहन जाने के लिए तैयार है। मानवरहित मिशन के बाद एक या डेढ़ साल के आसपास हम इंसानों को भेजने के लिए तैयार हो जाएंगे।'

गगनयान मिशन (Gaganyaan mission) के तहत दो मानवरहित यान अगले साल उड़ान भरेंगे। इस बात की जानकारी केंद्रीय मंत्री डॉक्टर जीतेंद्र सिंह (Dr Jitendra Singh) ने दी है। इनमें से एक यान अगली जनवरी में लॉन्च हो सकता है। उन्होंने बताया कि भारतीय दल को लेकर जा रहा यान साल 2023 में रवाना होगा। खास बात है कि भारत की पहली मानवयुक्त उड़ान 75वें स्वतंत्रता दिवस से पहले तय थी। इसकी घोषणा प्रधानमंत्री नरेंद्र मोदी (PM Narendra Modi) ने साल 2018 में की थी। हालांकि, कोरोना वायरस (Coronavirus) के चलते यह मिशन टल गया था।

केंद्रीय मंत्री ने उम्मीद जताई है कि मानव युक्त विमान और देश का समुद्र की गहराई वाला मिशन एक साथ शुरू हो सकते हैं। उन्होंने कहा, 'समय ऐसा हो सकता है कि जैसे हम एक व्यक्ति को अंतरिक्ष में भेज रहे हैं, वैसे ही एक शख्स को समुद्र में 5 हजार मीटर नीचे भेज रहे हैं। डीप ओशियन एक्सप्लोरेशन मिशन समय से पीछे चल रहा है, लेकिन अब इसने रफ्तार पकड़ ली है और हमने पहले ही मॉड्यूल की जांच कर ली है।'

पृथ्वी विज्ञान मंत्रालय के समुद्रयान मिशन के तहत तैयार किए गए मॉड्यूल को अक्टूबर में 600 मीटर की गहराई में ले जाया गया था। 5 हजार मीटर की गहराई तक इंसान को भेजने से पहले मानवरहित मॉड्यूल की जांच की जाएगी। सिंह ने कहा, 'हमारा मानवरहित वाहन जाने के लिए तैयार है। मानवरहित मिशन के बाद एक या डेढ़ साल के आसपास हम इंसानों को भेजने के लिए तैयार हो जाएंगे।'

बता दें कि यह घोषणा ऐसे समय पर की गई है, जब भारतीय अंतरिक्ष अनुसंधान संगठन (ISRO) महामारी के चलते अपने नियमित लॉन्च के मामले में पिछड़ रहा है। भारत ने बीते दो सालों में केवल चार लॉन्च मिशन किए हैं। अगर तुलना की जाए, तो चीन ने इस साल ही कम से कम 40 मिशन किए हैं, जो एक वैश्विक रिकॉर्ड है। आदित्य एल-1, स्पेस ऑब्जर्वेटरी XPoSat और चंद्रयान-3 तीन जैसे कई बड़े मिशन अटके हुए हैं।

<https://hindi.news18.com/news/nation/isros-gaganyaan-mission-will-start-again-from-2022-3869900.html>

Doing photon upconversion a solid: Crystals that convert light to more useful wavelengths

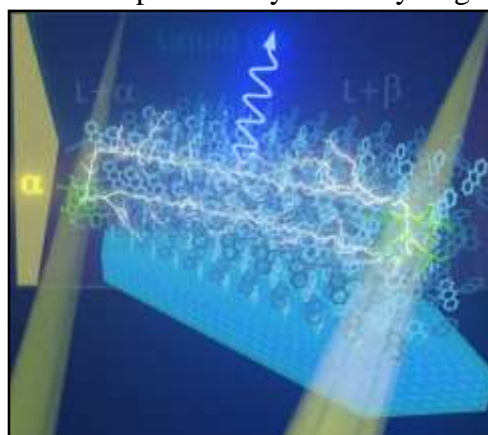
Solid-solution organic crystals have been brought into the quest for superior photon upconversion materials, which transform presently wasted long-wavelength light into more useful shorter wavelength light. Scientists from Tokyo Institute of Technology have revisited a materials approach previously deemed lackluster—using a molecule originally developed for organic LEDs—and have achieved outstanding performance and efficiency. Their findings pave the way for many novel photonic technologies, such as better solar cells and photocatalysts for hydrogen and hydrocarbon productions.

Light is a powerful source of energy that can, if leveraged correctly, be used to drive stubborn chemical reactions, generate electricity, and run optoelectronic devices. However, in most applications, not all the wavelengths of light can be used. This is because the energy that each photon carries is inversely proportional to its wavelength, and chemical and physical processes are triggered by light only when the energy provided by individual photons exceeds a certain threshold.

This means that devices like solar cells cannot benefit from all the color contained in sunlight, as it comprises a mixture of photons with both high and low energies. Scientists worldwide are actively exploring materials to realize photon upconversion (PUC), by which photons with lower energies (longer wavelengths) are captured and re-emitted as photons with higher energies (shorter wavelengths). One promising way to realize this is through triplet-triplet annihilation (TTA). This process requires the combination of a sensitizer material and an annihilator material. The sensitizer absorbs low energy photons (long-wavelength light) and transfers its excited energy to the annihilator, which emits higher energy photons (light of shorter wavelength) as a result of TTA.

Finding good solid materials for PUC has proven challenging for a long time. Although liquid samples can achieve relatively high PUC efficiency, working with liquids, especially those comprising organic solvents, is inherently risky and cumbersome in many applications. However, previous trials to create PUC solids generally suffered from poor crystal quality and small crystal domains, which led to short traveling distances of triplet excited states and thus, low PUC efficiency. Additionally, in most previous solid PUC samples, stability under continuous photoirradiation was not tested and experimental data were often acquired in inert gas atmospheres. Hence, the low efficiency and insufficient materials stability had been of concern for a long time.

Now, in a recent study led by Associate Professor Yoichi Murakami from Tokyo Tech, Japan, a team of researchers found the answer to this challenge. Published in *Materials Horizons*, their paper (open access) describes how they focused on van der Waals crystals, a classical materials class that has not been considered for the quest of high-efficiency PUC solids. After discovering that 9-(2-naphthyl)-10-[4-(1-naphthyl) phenyl]anthracene (ANNP), a hydrocarbon molecule originally developed for blue organic LEDs, was an excellent annihilator for embodying their concept, they tried mixing it with platinum octaethylporphyrin (PtOEP), a staple sensitizer that absorbs green light.



The sensitizer molecules (green) absorb low energy photons (long-wavelength light) and become excited into triplet states. These triplet states are then transferred to nearby annihilator molecules (blue), which then pass them around throughout the crystalline array of the annihilator. If two traveling triplet states meet at a single annihilator molecule, the combined excess energy produces a higher energy photon (shorter wavelength light). Credit: Yoichi Murakami from Tokyo Tech

The team found that aggregation of the sensitizer molecules could be completely avoided by utilizing the crystalline phase of a van der Waals solid solution with a sufficiently low proportion of PtOEP to ANNP (around 1:50000). They proceeded to thoroughly characterize the obtained crystals and found some insight into why using the ANNP annihilator prevented the aggregation of the sensitizer when other existing annihilators had failed to do so in previous studies. Moreover, the solid crystals the team produced were highly stable and exhibited outstanding performance, as Dr. Murakami remarks: "The results of our experiments using simulated sunlight indicate that solar concentration optics such as lenses are no longer needed to efficiently upconvert terrestrial sunlight."

Overall, this study brings van der Waals crystals back into the game of PUC as an effective way of creating outstanding solid materials using versatile hydrocarbon annihilators. "The proof-of-concept we presented in our paper is a major technical leap forward in the quest for high-performance PUC solids, which will open up diverse photonics technologies in the future," concludes Dr. Murakami. Let us hope further research in this topic allows us to efficiently transform light into its most useful forms.

More information: Riku Enomoto et al, van der Waals solid solution crystals for highly efficient in-air photon upconversion under subsolar irradiance, *Materials Horizons* (2021). DOI: [10.1039/D1MH01542G](https://doi.org/10.1039/D1MH01542G) <https://phys.org/news/2021-11-photon-upconversion-solid-crystals-wavelengths.html>

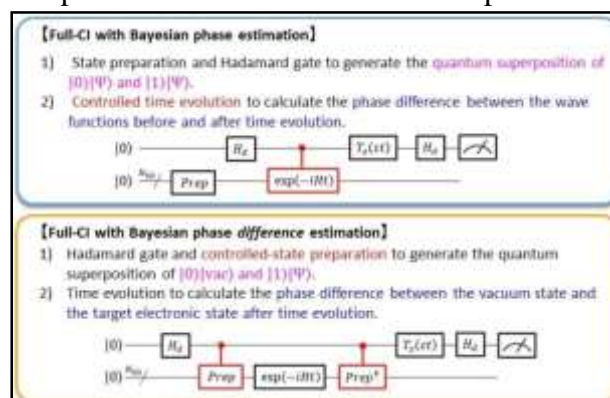


Sat, 27 Nov 2021

Newly improved quantum algorithm performs full configuration interaction calculations without controlled time evolutions

In a continuing effort to improve upon previous work, a research team at the Graduate School of Science, Osaka City University, has applied its recently developed Bayesian phase difference estimation quantum algorithm to perform full configuration interaction (full-CI) calculations of atoms and molecules without simulating the time evolution of the wave function conditional on an ancillary qubit. Superior to conventional methods in terms of parallel execution of quantum gates during quantum computing, this new algorithm is expected to be much easier to implement in actual quantum computers.

The researchers at the Osaka City University Graduate School of Science continue to improve their recently developed quantum algorithm, this time by applying it to calculate the potential energy curves of the H₂ molecule without the need for controlled time evolutions. By including a controlled-state preparatory step to the Bayesian phase difference estimation (BPDE) quantum algorithm they previously developed, the team calculated the superposition of the "vacuum" wave function with zero electrons and the wave function of the desired electronic state, bypassing the need to simulate the time evolution of the wave function conditional on an ancillary qubit. This addresses an issue common to conventional quantum algorithms, namely the parallel processing of quantum gates and high number of quantum gates between two non-neighboring



Comparison of the quantum circuit for Bayesian phase estimation based full-CI with that for Bayesian phase difference estimation based full-CI. Credit: Osaka City University

qubits—demonstrating itself as a quantum algorithm executable on quantum computers that can perform full configuration interaction (full-CI) calculations of atoms and molecules. Note that the full-CI calculations are capable of giving the optimized solutions of Schrödinger equations for microscopic systems, but not intractable for the sizable systems with classical computers because of the exponential explosion of required computing time.

Their research was published in *The Journal of Physical Chemistry Letters* as an open access article.

In the race to accurately solve the Schrödinger equation to show the electronic state of an atom or molecule, bringing a paradigm shift in scientific research and materials development, scientists have turned to quantum computers to carry out chemical calculations in polynomial time. The quantum phase estimation (QPE) algorithm has become a well-known and powerful tool in giving full-CI calculations of wave functions for small molecules, and various attempts have been made to have QPE-based methods account for the computational costs that exponentially accumulate against the system size under study.

"QPE-based methods simulate the time evolution of a wave function on an ancillary qubit, which requires many controlled quantum gates, the presence of which also hinders parallel execution of these gates and compression of quantum circuits," states lead author, Specially-Appointed Lecturer Kenji Sugisaki. "In this research, we have applied our Bayesian phase difference estimation (BPDE) algorithm, which is a modification of QPE and capable of bypassing the need of controlled time evolution operations, to perform full-CI calculations. We emphasize that our approach invokes the energy calculation of many-electron systems as referring to the counterpart of many-electron ionized systems."

"Evolving the wave function only when the first qubit is in the $|1\rangle$ state makes it difficult to parallelize the quantum gates," says research advisor, Professor Kazunobu Sato. "Rewriting the quantum logic circuit so that the time evolution operator can be applied regardless of whether the first qubit is in the $|0\rangle$ or $|1\rangle$ state would allow easy parallel processing of quantum gates and increase the likelihood of implementing the algorithm in actual quantum computers."

To do this, the team introduced a controlled-state preparation that constructs the quantum superposition of the "vacuum" wave function $|\text{vac}\rangle$ with zero electrons and the wave function $|\Psi\rangle$ of the target electronic state. "In other words, we computed the full-CI energy of an atom or molecule as its ionization energy," explains Professor Emeritus Takeji Takui, with the following logic circuit $(|0\rangle|\text{vac}\rangle + |1\rangle|\Psi\rangle)/\sqrt{2}$. The team exemplified the efficiency of their BPDE-based full-CI method by calculating the potential energy curves of four valence electronic states of the H_2 molecule. "The numerical simulations revealed that the BPDE-based method reproduces the full-CI energy within 3 kcal mol^{-1} of errors for all the electronic states," continues Prof. Takui, who also served as an advisor to the study.

Importantly, being free from controlled time evolution makes parallelization of quantum gates and implementation on real quantum devices easier, which gives the team hope that their Bayesian phase difference estimation algorithm paves the way for more practical full-CI calculations and becomes synonymous with precise quantum chemistry.

More information: Kenji Sugisaki et al, Quantum Algorithm for Full Configuration Interaction Calculations without Controlled Time Evolutions, *The Journal of Physical Chemistry Letters* (2021). DOI: [10.1021/acs.jpcllett.1c03214](https://doi.org/10.1021/acs.jpcllett.1c03214)

Journal information: [Journal of Physical Chemistry Letters](https://pubs.acs.org/journal/jpclett)
<https://phys.org/news/2021-11-newly-quantum-algorithm-full-configuration.html>

New research reveals the mechanism of ion transport in aqueous lithium ion batteries

Lithium-ion batteries are notorious for being a fire hazard due to their flammable organic electrolytes. As such, there has been much effort to utilize water-based electrolytes as a safer alternative. However, this is hampered by the problem of water molecules undergoing electrolysis into hydrogen and oxygen within the battery, which causes various problems such as poor efficiency, short device longevity, and safety issues.

To suppress unwanted electrolysis of water, it is necessary to dissolve the salts at extremely high concentrations in aqueous Li-ion batteries. Both volume and weight of salt in these electrolytes are higher than that of water, and hence they are referred to as water-in-salt electrolytes (WiSE). As a result, the viscosity of the electrolyte is very high, which in theory should hinder the transport of lithium ions. This is pretty much expected according to the conventional theory, which predicts the water-electrolyte system to exist as a homogeneous mixture in this superconcentrated environment. In other words, all water molecules should be interacting with ions, and thus hydrogen bonds among water molecules are completely disrupted.

However, Li-ion transport tends to be unexpectedly fast in these highly viscous WiSEs. Previous studies used Raman spectroscopy and molecular dynamics (MD) simulations to elucidate the extended electrochemical stability window of the water molecules in WiSE by observing the isolated water molecules that are completely surrounded by ions inside of these super-concentrated aqueous electrolytes. Still, it was not sufficient to explain the rapid lithium-ion transport within the WiSE.

Recently, a research team at the Center for Molecular Spectroscopy and Dynamics (CMSD) within the Institute for Basic Science (IBS) and Daegu Gyeongbuk Institute of Science & Technology (DGIST) have uncovered the correlation between water dynamics and Li-ion transport. They used polarization selective infrared pump-probe spectroscopy (IR-PP) and dielectric relaxation spectroscopy (DRS) to observe water molecules in a super-concentrated salt solution.

IR-PP is time-resolved nonlinear spectroscopy that can detect vibrational and rotational dynamics of an individual water molecule, which is useful for determining its hydrogen bonding partner. Meanwhile, DRS serves as a complementary tool to measure the concentration of chemical species present in the electrolyte and provide clues to the collective properties of the solution.

Using these techniques, the team observed that a significant amount of bulk-like water in WiSE exhibits the properties of pure water. This means that even under super-high salt concentrations (28 m), there are still "pockets" of bulk water molecules that form hydrogen bonds with other water molecules, which indicate heterogeneity in the solvation structure in nanoscales. In addition, it turned out that the rotational dynamics of bulk-like water are faster than that of anion-bound water. These observations identified the cause of fast Li-ion transport relative to the large viscosity of superconcentrated aqueous electrolytes.

The researchers emphasized, "This study is the first case of explaining the observation of the dynamics of water molecules in superconcentrated aqueous electrolytes at a molecular level," and



Credit: Pixabay/CC0 Public Domain

"It is possible because IR-PP has the ability to distinguish and observe water molecules according to their hydrogen-bonding partner."

Prof. CHO Min Haeng, the director of CMSD, said, "Water played an important role in Li-ion transport mechanisms, and not just the dissolved salts in superconcentrated aqueous electrolytes. This research is expected to provide design principle for other superconcentrated electrolytes at the molecular level that can promote the transport of Li-ions."

This research was published in the online edition of *ACS Energy Letters* on Nov 25.

More information: Jungyu Kim et al, Dynamic Water promotes Lithium-Ion Transport in Superconcentrated and Eutectic Aqueous Electrolyte, *ACS Energy Letters* (2021), DOI: [10.1021/acsenergylett.1c02012](https://doi.org/10.1021/acsenergylett.1c02012)
<https://phys.org/news/2021-11-reveals-mechanism-ion-aqueous-lithium.html>

COVID-19 Research News



Sun, 28 Nov 2021

COVID-19 causing diabetes among some severely infected patients, studies find

By Ahmar Khan

When Craig Spanz continued to suffer headaches after contracting COVID-19 in March, he thought he may be experiencing some long COVID symptoms. The Vancouver resident expected to be told by his doctor on how to cope with his constant head pain, but instead he was diagnosed as diabetic.

"It was like a little over two weeks after COVID-19 was officially over, when I found out I was diabetic," said Spanz.

As new variants of concern emerge, there is growing certainty among medical experts that the virus could be causing diabetes, too. Two studies supported by the National Institute of Health (NIH) in the United States found that COVID-19 was causing serious damage to the beta cells in the pancreas, limiting how much insulin could be created. If there is an insufficiency of insulin, blood glucose levels will spike resulting in diabetes.

"The virus can directly damage the cells that produce insulin, which is the master key to control glucose, so less insulin, less glucose control," said Dr. Remi Rabasa, an endocrinologist at the University of Montreal.

There are at least two other ways the virus could be causing damage inside the human body which could lead to diabetes. If infected by COVID-19, the virus can replicate in the pancreas and into other cells which surround the beta cells. The virus can also cause cells to malfunction so that they're no longer able to properly regulate blood.

Forty-nine-year-old Spanz admitted he did have some markers for pre-diabetes, but said his bout with COVID-19 was dreadful. It resulted in him being hospitalized as he suffered from difficulties breathing, severe chest pains and a loss of sensation in his extremities.

What Spanz was describing is a severe infection, which Rabasa said "can limit the ability of insulin to act in the tissues," and is just one of "multiple ways by which COVID-19 could trigger diabetes."

A Sept. 15 study published on cell.com found that rising blood sugar levels were common among hospitalized COVID-19 patients. Patients required longer hospital stays and had a higher risk of “developing acute respiratory distress syndrome and increased mortality.”

Researchers of the study concluded that hyperglycemia, a spike in blood sugar levels, was being caused by COVID-19 disrupting fat cells’ production of adiponectin, a hormone that helps regulate blood sugar levels.

Rabasa, who also works at the Centre hospitalier de l’Université de Montréal said that he’s been seeing more patients who are dealing with bad cases of COVID-19 display hyperglycemia. He noted that there is “evidence that short term COVID is leading to diabetes.”

He added that we could simply be seeing high blood sugar for a short period of time, which means that while some people may not develop diabetes right away, the effects on their beta cells and tissue damage could be lingering and make them more susceptible to getting it later on.

Research at Harvard Medical School found that of 551 patients hospitalized for COVID-19 in Italy, nearly half became hyperglycemic. Patients were tracked for six months following the initial infection and researchers found that hyperglycemia remained in about 35 per cent of people.

Experts say the concern is not just that patients are contracting diabetes from COVID, but that anyone who is already diabetic that gets COVID is at a higher risk. A Scottish study found that people who already had Type 1 or Type 2 diabetes were already at greater risk of a worse outcome if they contracted COVID-19.

“Overall risks of fatal or critical care unit-treated COVID-19 were substantially elevated in those with Type 1 and Type 2 diabetes compared with the background population,” reads the study.

While infection could be one of the concerns resulting in diabetes, Rabasa said that COVID-19 also has indirect effects on how someone could become diabetic. He mentioned that the “lack of exercise and sedentary lifestyles,” that have resulted from the pandemic where more people are restricted to being at home, could also contribute to it.

“If you’ve been less active, are eating not as good as you’re supposed to, COVID is causing you stress to eat your emotions, those things drive Type 2 diabetes,” he said.

What does the data tell us?

It’s been 100 years since the discovery of insulin, a medical advancement that has allowed people with diabetes to regulate their blood sugar levels at all times. Despite the leaps in medicine and understanding that exercise and good nutrition can help stave off diabetes, there has been a “trend of more people coming forward with newly diagnosed diabetes,” according to Dr. Seema Nagpal, vice president of science and policy at Diabetes Canada.

“It’s a concern that we already see very high rates of diabetes and that this might be another contributing factor,” she said.

A 2020 analysis by McMaster University found that of patients with severe COVID-19, nearly 15 per cent developed diabetes. The authors of the study noted some people could already have been at-risk of diabetes before contracting the virus.

Nagpal noted that there hasn’t been data collected in Canada regarding the current rate of diabetes since the pandemic began. As a result, she said Diabetes Canada can’t confirm if the potential spike in diabetes rates is directly caused by COVID-19.

A New York-based study that looked at patients hospitalized at New York-Presbyterian Hospital/Weill Cornell Medical Center and affiliated campuses at Queens and Lower Manhattan Hospital found that 49.7 per cent of the 3,864 patients diagnosed between March 1, 2020 and May 15, 2020, had hyperglycemia.

While nearly half of the patients suffering from hyperglycemia is staggering, the numbers rose to “91.1% and 72.8% among intubated and deceased patients,” researchers found. The hospital stay for people with hyperglycemia was 10 days compared to five days for those without.

The authors of an August 2021 study by Stanford University definitively concluded that “SARS-CoV-2 can directly induce beta cell killing,” which would support the growing evidence that COVID-19 has direct ties to diabetes.

How to combat diabetes?

Outside vaccines and masks being ways to limit COVID-19 infections and therefore potential cases of diabetes, there are ways to mitigate risk. Diabetes Canada notes making lifestyle changes helps reduce your chance of developing diabetes.

“Eating healthy, moving more, and losing weight if you are overweight are the most effective things you can do to reduce your risk of developing Type 2 diabetes,” they write on their website.

Spanz is grateful for early diagnosis in his path to recovery, saying he’s been able to incorporate better nutrition and exercise in his diet to keep his diabetes in check. He said he watches how much carbohydrates, fat and sugar he eats and is overall a lot more aware of his dietary choices.

Since he implemented the changes, Spanz said the headaches are not as frequent and he feels physically much better.

“It feels like it’s suddenly – from the middle of October – it feels like it suddenly has been dropping off,” he said. — *with files from Jamie Maraucher and Leslie Whyte*

<https://globalnews.ca/news/8406931/covid-19-diabetes-severely-infected/>

