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

Thu, 21 Jul 2022

Air Force Achieves 95% Self-sufficient in Supply of Spare Parts and Saves Rs 600 Crore in 5 Years

According to Air Marshal Vibhas Pande, commander of the IAF's Maintenance Command, the Indian Air Force (IAF) has achieved 95% self-reliance in the provision of spare parts for the maintenance of its key assets and has saved Rs 600 crore in the previous five years by employing indigenous products. Additionally, he stated that in the upcoming three years, batteries and tyres will be produced domestically for all of the IAF's important aircraft fleets. During a two-day avionics indigenisation seminar, AVISEM-22, held at the Base Repair Depot of the IAF in Pune, Air Marshal Pande, Air Officer Commanding-in-Chief of the Nagpur-based Maintenance Command of the IAF, informed media.

Regarding the function of the IAF's Maintenance Command, Air Marshal Pande stated, "The Maintenance Command undertakes the task of developing them whenever we encounter the problem in terms of non-availability of a spare or LRU (Line Replaceable Unit). You'll be pleased to learn that as of right now, we have a 95% self-reliance rate for both mandatory replacements and spares that are a part of our Automatic Replenishment System (ARS). We have a plan in place that calls for having all the tyres and batteries on hand domestically within the next three years for the critical aircraft fleets. We won't be importing any of these products.

The creation of more than 200 avionics scenarios was the main focus of this specific session. Because of this, we wish to spread the novel concept of the Modular Open System Architecture Framework so that we can utilise the technology at our disposal to its fullest potential. Air Marshal Pande said after giving the keynote speech, "Indian Industry has always worked hand in hand with the Air Force. Because of their kindness, I can now say that I have achieved 95% self-reliance. When asked how adopting indigenous products may help lower costs, he responded, "To give you the sum of savings that we have accrued, in the last five years by using the indigenous products we have resorted to saving of roughly Rs 600 crore. That was the final figure we could come up with.

Speaking more specifically about domestically produced batteries and tyres, Air Marshal Pande remarked that the Su-30 aircraft's tyres have already been created. "We will start developing

tyres for all of the aeroplanes that will serve us for more than ten years from now. We also created the technology for retreading IL-76 tyre tread, and we are successfully employing it. We have created batteries for many fighter aircraft, some training aircraft, all MI-17 series helicopter batteries, AWACS (Airborne Warning and Control System), and the IL-76 and IL-78 platforms, among other platforms. Others are in the works and will bear fruit in due time.

The primary goals of the seminar, according to IAF officers, were to put the Union Government's AatmaNirbhar policy into practise, to encourage the use of Commercial Off-the-Shelf (COTS) technology in aviation systems, and to lessen reliance on Original Equipment Manufacturers (OEM) with Western and Russian ancestry. To discuss the process of developing a workable framework for domestic repair and development of avionic aggregates within the nation, participants from the Defence Research and Development Organisation (DRDO) facilities, academia, and the civil aviation industry were invited to the conference.

"Indigenisation of Avionics Aggregates Based on Modular Open System Architecture (MOSA) Framework" was the seminar's focus. The Air Headquarters' Indigenisation Directorate oversaw the event. Regarding the Maintenance Command's attempts to promote indigenous culture, Pande stated, "We are attempting to establish a consortium at the national level with the participation of all necessary parties. In addition to the Indian Air Force, it will include business, development organisations, certification organisations, and quality control organisations. It will be a national committee with various subcommittees with varying responsibilities.

https://defenceaviationpost.com/air-force-achieves-95-self-sufficient-in-supply-of-spare-parts-and-saves-rs-600-crore-in-5-years/

THE ECONOMIC TIMES

Thu, 21 Jul 2022

ASEAN, India Call for Strengthening Global Cooperation to Combat Terrorism

India and ASEAN have strongly condemned terrorism in all its forms and emphasised the need to strengthen global cooperation to combat the menace in a comprehensive manner. The issue figured prominently at the ninth ASEAN-India Senior Officials Meeting on Transnational Crimes (SOMTC) that took place virtually on Wednesday. "Both sides strongly condemned terrorism in all its forms and manifestations and emphasised the need to strengthen international cooperation to combat terrorism and transnational crimes in a comprehensive and sustained manner," the Ministry of External Affairs (MEA) said. It said the two sides discussed ways to enhance cooperation to combat terrorism, illicit drug trafficking and cybercrime under the framework of the ASEAN-India work plan to combat transnational crimes.

"Institutional linkages and capacity building programmes between the two sides were also discussed," the MEA said in a statement. The Association of Southeast Asian Nations (ASEAN) is considered one of the most influential groupings in the region, and India and several other countries including the US, China, Japan and Australia are its dialogue partners.

The ASEAN-India dialogue relations started with the establishment of sectoral partnership in 1992 which graduated to full dialogue partnership in December 1995 and summit-level partnership in 2002. The ties were elevated to a strategic partnership in 2012. ASEAN is central to India's Act East Policy and its vision for the wider Indo-Pacific. ASEAN comprises Indonesia, Thailand, Vietnam, Laos, Brunei, the Philippines, Singapore, Cambodia, Malaysia and Myanmar.

https://economictimes.indiatimes.com/news/defence/asean-india-call-for-strengthening-global-cooperation-to-combat-terrorism/articleshow/93030311.cms

Thu, 21 Jul 2022

After the House, US Senate Moves to Deepen Ties with India on Defence, Emerging Tech

In yet another signal of Capitol Hill's political commitment to the India-United States (US) strategic relationship, the Senate Armed Services Committee (SASC), in its version of the National Defence Authorisation Act (NDAA), has asked Pentagon to step up its engagement with India on issues of "emerging technologies, readiness and logistics" within 90 days of the passage of the legislation. Among other issues, the Senate version of NDAA has identified intelligence collection capabilities, unmanned aerial vehicles (UAVs), 5G, fourth and fifth generation aircraft, and joint research and development (R&D), as areas for cooperation with India. It has also asked the secretary of defence to submit a report on the issue to the appropriate committees in the Senate and House of Representatives within 180 days. The Senate Armed Services Committee (SASC), which has piloted the legislation, has proposed an $847 billion budget for national defence in 2023. In their comments on the act and the challenges faced by the US, the chair of the committee, Democrat Jack Reed highlighted the emergence of China as America's most "consequential strategic competitor", while ranking member of the committee, Republican Jim Inhofe, spoke of the Chinese Communist Party "accelerating the already historic modernisation of its military".

Process

The House passed its own version of the NDAA last week, incorporating an amendment that advocated for a sanctions waiver for India for its purchase of the S-400 missile system from Russia - an acquisition that could trigger sanctions under the Countering America's Adversaries through Sanctions Act (CAATSA). The executive has the authority to give the waiver, but the passage of the amendment, proposed by Congressman Ro Khanna, with 330 votes is seen as a political signal to the administration. In the Senate, as a part of a distinct process, the language on India has now been incorporated as a part of the base text. It will go through its own process of amendments and floor vote. And then the Senate and House versions will be reconciled in conference.

If the House amendment explicitly refers to the current threats faced by India, including from China, and speaks of the need to aid India's diversification away from Russia, the Senate version

of NDAA focuses on core policy areas for the future where both India and the US are seeking to deepen collaboration. It also lays out guidelines for the executive to follow.

Provisions

In Section 1246, titled “enhancing major defence partnership with India”, the proposed act says that within 90 days of its passage, the secretary of defence shall direct “appropriate personnel” within the department of defence (DOD) to “seek to engage their counterparts” in the ministry of defence (MOD) for the “purpose of expanding cooperation on emerging technologies, logistics and readiness”. It then goes out to list the issues that DOD personnel, “at the minimum”, must engage with India on. These include intelligence collection capabilities, UAVs, fourth and fifth generation fighter aircraft, depot level maintenance, joint R&D, 5G and Open Radio Access Network Technologies (ORAN), cyber, cold weather capabilities, and any other matter that the secretary sees as relevant.

Among these issues, 5G and ORAN have emerged as a key pillar of India-US cooperation both within the bilateral format and under Quad as both countries seek to prevent Chinese dominance in the sector and come up with an alternative. Cold weather capabilities assume significance at a time when India is locked into a military confrontation with China in eastern Ladakh. Cyber remains a growing area of convergence, while there is increased bilateral discussion on UAVs especially with American defence companies. And the emphasis on joint R&D is seen as an acknowledgment of the scientific talent that India can bring to the table as well as a realisation that the US has to be more open to technology-sharing, a key issue that has prevented the further deepening of ties.

The follow-up

The proposed act then says that the secretary, within six months, must brief the Senate and House committees and provide an “assessment of the feasibility and advisability” of expanding cooperation with MOD on areas listed above, as well as describe opportunities to expand cooperation in other areas. It also asks the secretary to describe “challenges, including agreements, authorities and resourcing” that are needed to expand cooperation. The secretary has to also brief the committees on security considerations to ensure the protection of R&D, intellectual property and US equipment. The proposed law also asks the secretary to identify opportunities for academia and private sector to participate in expanded cooperation with MOD, a provision that can aid India’s effort to woo foreign capital in the defence domain to “Make in India”.

https://www.hindustantimes.com/world-news/after-the-house-us-senate-moves-to-deepen-ties-with-india-on-defence-emerging-tech-101658381891879.html

IDN INDIAN DEFENCE NEWS
Global Defence, Aerospace & Security

Fri, 22 Jul 2022

US Senate Version of NDAA Seeks to Enhance Defence Partnership with India

A key committee of the US Senate has sought to bolster the defence partnership with India and take it to a new level through greater cooperation in intelligence collection, drones and fourth and fifth generation aircraft. The move by the powerful Senate Armed Services Committee comes a week after the House of Representatives passed a legislative amendment as part of the National Defence Authorization Act (NDAA) that waived off punitive CAATSA sanctions for India. NDAA is the annual budget of the United States. The House version of NDAA was passed last week. The Senate Armed Services Committee released its version of the National Defence Authorization Act for FY 2023 On Wednesday.

It includes a Section on "Enhancing the Major Defence Partnership with India" which envisages greater cooperation in intelligence collection, drones and fourth and fifth generation aircraft. It also includes depot-level maintenance, joint research and development, 5G and Open Radio Access Networks (RAN); cyber and cold-weather capabilities. The Section also asks the defence secretary to explore other areas for expanding cooperation with India, including a description of the challenges, agreements, authorities that may be required, and also an articulation of security considerations including protection of research and development and intellectual property. Among other things, it also asks the defence secretary to identify opportunities for the private sector to work with the Ministry of Defence in India. The US House of Representatives passed a legislative amendment last week that approves an India-specific waiver for punitive CAATSA sanctions for its purchase of the S-400 missile defence system from Russia.

Authored and introduced by Indian-American Congressman Ro Khanna, the amendment urges the Biden administration to use their authority to provide India with a Countering America's Adversaries Through Sanctions Act (CAATSA) waiver to help deter aggressors like China. The legislative amendment was passed by voice vote as part of an enbloc (all together as a single unit) amendment during floor consideration of the National Defence Authorisation Act (NDAA). CAATSA is a tough US law that authorises the US administration to impose sanctions on countries that purchase major defence hardware from Russia in response to Russia's annexation of Crimea in 2014 and its alleged meddling in the 2016 US presidential elections.

http://www.indiandefensenews.in/2022/07/us-senate-version-of-ndaa-seeks-to.html?m=1

Business Standard

Fri, 22 Jul 2022

India, UK NSAs Discuss Regional Security, Cooperation in Defence Sector

National Security Adviser Ajit Doval met his United Kingdom counterpart Stephen Lovegrove here on Thursday and discussed a wide range of subjects of bilateral and global significance, government sources said. They said the key points discussed included cooperation in cyber security, maritime and Indo-Pacific, regional security, and dealing with violent extremism. The focus was on specific and substantial outcomes to take the partnership forward in line with the vision of the India-UK Roadmap 2030, government sources said. Taking forward discussions between Prime Ministers Narendra and Boris Johnson, the NSAs also discussed forward-looking cooperation in the technology and defence sectors with a focus on key objectives of the Atmanirbhar Bharat initiative, the sources said.

British High Commission said in a tweet the two NSAs discussed regional security and reiterated their commitment to transforming defence and security cooperation. "UK National Security Adviser Sir Stephen Lovegrove met National Security Advisor of India Ajit Doval in Delhi. As a part of the India-UK Comprehensive Strategic Partnership, they discussed regional security reiterated their commitment to transform defence and security cooperation." UK National Security Adviser also met with External Affairs Minister S Jaishankar. "UK National Security Adviser Sir Stephen Lovegrove also met with External Affairs Minister @DrSJaishankar They held further discussions about the Comprehensive Strategic Partnership between the UK and India," the British High Commission said.

https://www.business-standard.com/article/current-affairs/india-uk-nsas-discuss-regional-security-cooperation-in-defence-sector-122072200039_1.html

IDN INDIAN DEFENCE NEWS
Global Defence, Aerospace & Security

Fri, 22 Jul 2022

China to Deploy PHL-16 MLRS on Sino-Indian Border

According to Chinese official media echoed by Pravin Sawhney of frontierindia.com, China has reportedly recently tested a brand-new high-altitude rocket launching system. The 16th round of military negotiations on the Sino-Indian border has just concluded, and the PHL-16 (or Type PCL191) multiple launch rocket system (MLRS) may now be stationed in the Himalayas. The launcher, mounted on a truck, hit its target several kilometres away in a desert of western China, China Central Television (CCTV) reported on Sunday, July 17.

A battery includes six launcher vehicles, several reloading vehicles, a command post vehicle, a vehicle for conducting meteorological surveys, and various service support vehicles. It is based on the NORINCO AR-3 MRL that was first marketed in 2010. The PHL-16 was unveiled during

the Chinese National Day Parade in 2019; unlike other rocket systems in the parade, the vehicles were unlabelled. The novelty is that, in addition to rockets with a range of 350 kilometres, the system can now fire so-called "Fire Dragon" ballistic missiles, capable of striking at 500 kilometres. It means that it can hit any Indian military base from the territory under Chinese control, Frontier India writes.

http://www.indiandefensenews.in/2022/07/china-to-deploy-phl-16-mlrs-on-sino.html?m=1

IDN INDIAN DEFENCE NEWS
Global Defence, Aerospace & Security

Thu, 21 Jul 2022

F/A-18 Super Hornet Built for Carrier OPS, 'Compliant' with INS Vikramaditya & Vikrant Claims Boeing

The F/A-18 Super Hornet's successful completion of its trials in Goa earlier this year "reinforced" its ability to effectively and safely operate off Indian Navy carriers," the fighter aircraft's maker, American aviation giant Boeing, said Wednesday. The American firm, which is in competition with French aviation major Dassault Aviation for a mega Indian Navy contract for new fighters, said two U.S. Navy F/A-18E Super Hornets had completed multiple ski-jumps, roll-in and fly-in arrestment (when an aircraft lands on a carrier and decelerates rapidly using arresting gear).

They also did performance flights, in a variety of weights in the air-to-air, air-to-ground, and air-to-surface configurations, "meeting the Indian Navy test requirements". The company asserted that the F/A-18 Super Hornet was designed and built for carrier operations, and is "fully compliant" with the aircraft carriers INS Vikramaditya and INS Vikrant. The F/A-18 will be able to operate on the deck, in the hangar and on the lifts of the Indian Navy's aircraft carriers, the company said in a statement. It was reported that the Indian Navy would enter into a government-to-government contract with either the US or France for the purchase of more than two dozen fighter aircraft.

Sources in the defence and security establishment had also said that a trial report on operational demonstrations by the two aircraft — Boeing's F/A-18E and Dassault's Rafale-M — should be completed within two months, and further clarifications could be sought from the two companies in contention. Following this, the Navy hopes to move the procurement proposal to the defence ministry by the end of 2022.

Next-Generation Upgrade

"The Boeing team was privileged to showcase the F/A-18 Super Hornet's compatibility with Indian carriers in Goa," said Alain Garcia, vice president, India business development, Boeing Defence, Space & Security and Global Services. He added that the F/A-18 Super Hornet is one of the world's most proven and affordable multi-role fighters, and continues to evolve with the development of the next-generation Block-III capability, which will be game-changing for India.

"With the Super Hornet Block-III, the Indian Navy would not only get the most advanced platform but would also benefit from tactics, upgrades, and knowledge related to the naval aviation ecosystem that the U.S. Navy offers," he added. The tests in Goa followed eight ski-jumps in various weights and configurations during previous tests held at Naval Air Station (NAS) Patuxent River in Maryland in late 2020, which demonstrated the Super Hornet's ability to operate from a short take-off but arrested recovery (STOBAR) aircraft carrier.

As the U.S. Navy's frontline fighter, with more than 800 aircraft delivered around the world and over 2.5 million flight hours flown, the Super Hornet Block-III offers opportunities for cooperation and interoperability between the United States and India navies, Boeing added. It further said that Boeing and the US Navy had made multi-billion-dollar investments in infusing new technologies into the Super Hornet Block-III, including increasing the life of the airframe to 10,000 hours from Block-II's 6,000 hours of Block-II, as well radar cross-section improvements and an advanced crew station that includes a large area display. As its competitor, the twin-seater version of the Rafale-M, cannot operate from an Indian aircraft carrier, Boeing played on this in its statement.It said that the twin-seater carrier compatible variant of the Super Hornet offers several unique advantages to the Indian Navy, including flexibility, higher utilisation of the fleet, and the ability to embark on certain missions from the carrier that benefit from having a second crew member.

Additionally, two-seater F/A-18 Super Hornets can be used both as trainers (ashore and on the carrier) and as fully capable fighters, operational from the carrier and from land bases.

http://www.indiandefensenews.in/2022/07/fa-18-super-hornet-built-for-carrier.html

IDN INDIAN DEFENCE NEWS
Global Defence, Aerospace & Security

Thu, 21 Jul 2022

UK'S Tempest Demonstrator Set to Take Wing

The UK will build and fly a technology demonstrator for the Tempest next-generation fighter, and it will take to the air in the next five years. Confirmation came in parliament on Monday with an announcement by defence secretary Ben Wallace. "The design and development of the demonstrator represent an important milestone, showcasing the success and talent of our engineers, programmers, and software developers," he said. "This program will go on to attract opportunities for many more great minds and talent from across the UK."

The Future Combat Air System program was formally launched in 2018 and, while a demonstrator for the Tempest sixth-generation fighter that lies at its heart was mooted, there was no confirmation that one would be built and flown. The demonstrator program has already been underway for two years, reported Richard Berthon, director of Future Combat Air with the UK's defence ministry. Funding for the trials aircraft has come entirely from the UK, from both government and industry. However, Berthon noted that officials are exploring international participation. Representing the first UK fighter demonstrator since the British Aerospace EAP that informed the design of the Typhoon in the 1980s, the demonstrator will be a supersonic

aircraft with internal weapons carriage capability. The latter will certainly aid Team Tempest member MBDA, which is studying and developing a range of weapons for the Tempest, for which aircraft/weapon clearance from a bay at high speed is a significant challenge.

The exact nature of the demonstrator or its powerplant has yet to be defined, and neither has the full scope of its activities. Early flights will validate the results of computer modelling. However, the demonstrator is being built as much to provide knowledge about “how we do things” as capabilities, said Berthon, such as the way the development of underpinning technology and methods and manufacturing processes can be conducted in an all-digital environment. A series of related programs is reducing development time cycles by considerable amounts, in turn making those developments cheaper to undertake.

Meanwhile, much of the Tempest’s integrated sensor suite will be tested on the Boeing 757 “Excalibur” testbed, which is being converted by 2Excel Aviation. Plans call first flight by the end of the decade so that it can support the final period of development leading to the Tempest's stated in-service date of 2035.

Along with the demonstrator program, Team Tempest announced that studies are being undertaken into adopting a more aligned approach to development with Italy and Japan. “I’m delighted that the UK, alongside Italy and Japan, are working on similar combat air journeys together," said Wallace. "Our work with Japan and Italy on cutting-edge technology like this shows the benefit of our alliances across the world.” The three countries share similar military goals and requirements, approaches to sovereignty, and capabilities at a technology/industrial level. Another development announced was the launch of the Generation Tempest initiative, a drive to accelerate the recruitment of people with the necessary skills for the development process and beyond.

http://www.indiandefensenews.in/2022/07/uks-tempest-demonstrator-set-to-take.html

Science & Technology News

INDIA TODAY

Thu, 21 Jul 2022

When will Gaganyaan, Chandrayaan-3 Missions Fly to Space? Govt Answers in Parliament

The Indian Space Research Organisation (Isro) will conduct the first abort demonstration test on India's ambitious astronaut mission by the end of this year. The test will be conducted on the crew module being designed and developed indigenously by Isro to test the abort safety feature in case of an emergency.While experts hope that the maiden uncrewed mission will launch by the end of 2023, the centre is yet to say anything on the matter pertaining to the Rs 9,023 crore

project. The details of the first milestone mission were revealed in Parliament by the Department of Space to a question raised by Congress MP T. N. Prathapan.

The Gaganyaan mission is one of the most challenging undertakings by Isro, which has been known for acing difficult missions. The Indian space agency wants to leave no stone unturned on the mission, which will involve three Indian astronauts. Four Indian Air Force officers, whose names remain confidential, are training for the mission and have been working with Russia's Roscosmos for the mission.

Chandryaan-3 Flies to Moon in 2023

While the abort test for Gaganyaan happens by the end of this year, the Centre has announced plans to launch the much-awaited Chandrayaan-3 mission and the Aditya L-1 mission in 2023. As Chandrayaan-3 heads to the Moon, the Aditya L-1 will be India's maiden mission targeting the Sun.The Department of Space in its response stated that both the Chandrayaan-3 mission and the Aditya L-1 will launch in the first quarter of 2023. The Chandrayaan-3 is a successor of the Chandrayaan-2 mission that crash-landed on the lunar surface in what was one of the biggest losses for the Indian space agency. Meanwhile, the Aditya L1 mission that will be placed in the first Lagrange point of the Earth-Sun system will study a number of properties of the Sun, such as the dynamics and origins of coronal mass ejections. Isro had earlier said that it would be trying to launch the lunar mission by the end of 2022, but the new information clears the air around the mission, which has been further delayed to next year.

Apart from these two big-ticket missions, Isro will also launch the space docking experiment, which will include launching two satellites on PSLV and then making to dock with each other in the vacuum of space. The project could set the stage for a future space station from India. The mission, which has been delayed and is estimated to cost India Rs 124.47 crores, will launch in the third quarter of 2024.The Centre in a written reply also added that there are no plans to establish a new Isro Centre in the country.

https://www.indiatoday.in/science/story/when-will-gaganyaan-chandrayaan-3-missions-fly-to-space-govt-answers-in-parliament-1978269-2022-07-21

Thu, 21 Jul 2022

Quantum Computer Works with More Than Zero and One

We all learn from early on that computers work with zeros and ones, also known as binary information. This approach has been so successful that computers now power everything from coffee machines to self-driving cars and it is hard to imagine a life without them. Building on this success, today's quantum computers are also designed with binary information processing in mind. "The building blocks of quantum computers, however, are more than just zeros and ones," explains Martin Ringbauer, an experimental physicist from Innsbruck, Austria. "Restricting them to binary systems prevents these devices from living up to their true potential." The team led by Thomas Monz at the Department of Experimental Physics at the University of Innsbruck, now succeeded in developing a quantum computer that can perform arbitrary calculations with so-

called quantum digits (qudits), thereby unlocking more computational power with fewer quantum particles. Their study is published in *Nature Physics*.

Quantum systems are different

Although storing information in zeros and ones is not the most efficient way of doing calculations, it is the simplest way. Simple often also means reliable and robust, so binary information has become the unchallenged standard for classical computers. In the quantum world, the situation is quite different. In the Innsbruck quantum computer, for example, information is stored in individual trapped Calcium atoms. Each of these atoms naturally has eight different states, of which typically only two are used to store information. Indeed, almost all existing quantum computers have access to more quantum states than they use for computation.

A natural approach for hardware and software

The physicists from Innsbruck have now developed a quantum computer that can make use of the full potential of these atoms, by computing with qudits. Contrary to the classical case, using more states does not make the computer less reliable. "Quantum systems naturally have more than just two states and we showed that we can control them all equally well," says Thomas Monz. On the flipside, many of the tasks that need quantum computers, such as problems in physics, chemistry, or material science, are also naturally expressed in the qudit language. Rewriting them for qubits can often make them too complicated for today's quantum computers. "Working with more than zeros and ones is very natural, not only for the quantum computer but also for its applications, allowing us to unlock the true potential of quantum systems," explains Martin Ringbauer.

https://phys.org/news/2022-07-quantum.html

Press Information Bureau
Government of India

Ministry of Science & Technology

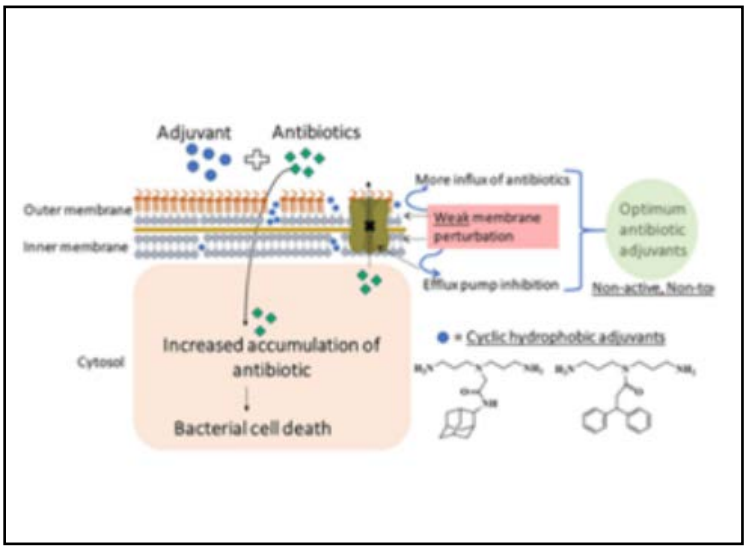
Thu, 21 Jul 2022

Hydrophobic Ingredients, In Combination with Obsolete Antibiotics, Can Counter Multidrug-Resistant Bacteria

A new ingredient that can weakly perturb bacterial membrane, thus countering bacterial resistance to multiple classes of antibiotics, can help revive the efficacy of obsolete antibiotics. This strategy can combat the most critical group of bacteria enabling the existing antibiotic arsenal to be used again for complicated infections. It can help counter the rising menace of anti-microbial resistance. The World Health Organization has demarcated Acinetobacter baumannii, Pseudomonas aeruginosa, and Enterobacteriaceae, all of which are resistant to carbapenems as the topmost priority critical pathogens. There are a few treatment options for these bacteria triggering use of combinations of various antibiotics to treat such complicated

infections. It was thus pertinent to develop novel non-conventional therapeutic strategies to deal with these pathogens.

Scientists at JNCASR, an autonomous institute of the Department of Science and Technology, have come up with the approach of revitalising the efficacy of existing antibiotics by using them in combination with antibiotic adjuvants -- ingredients that can help counter resistance to existing antibiotics. This novel idea can help strengthen the activity of obsolete antibiotics and bring them back into use for treating complicated infections.



Ms. Geetika Dhanda and Prof. Jayanta Haldar incorporated cyclic hydrophobic moieties (portion of a molecule) in a triamine-containing compound the adjuvants thus developed weakly perturbed the membrane of bacteria. This resulted in countering of membrane-associated resistance elements like permeability barrier and expulsion of antibiotics by efflux pumps. When these adjuvants are used in combination with antibiotics that had been rendered ineffective due to such membrane-associated resistance elements, the antibiotics are potentiated, and the combination was effective in killing bacteria.

The combination of the adjuvant with antibiotics like fusidic acid, minocycline, and rifampicin inactivates multidrug-resistant Gram-negative bacteria. These include *Acinetobacter baumannii*, *Pseudomonas aeruginosa*, and *Enterobacteriaceae*. The study published in the journal *ACS Infect. Diseases*, highlight the chemical intuition and extent of membrane-perturbation required for the design of non-active and non-toxic adjuvants. The choice of non-active adjuvant would also put less pressure on the bacteria to develop resistance to it. Moreover, weak membrane perturbation would result in less toxicity.

This work requires proper validation in *in-vivo* model systems, followed by preclinical studies, which will further add value to the work.

https://pib.gov.in/PressReleasePage.aspx?PRID=1843421