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June
2023

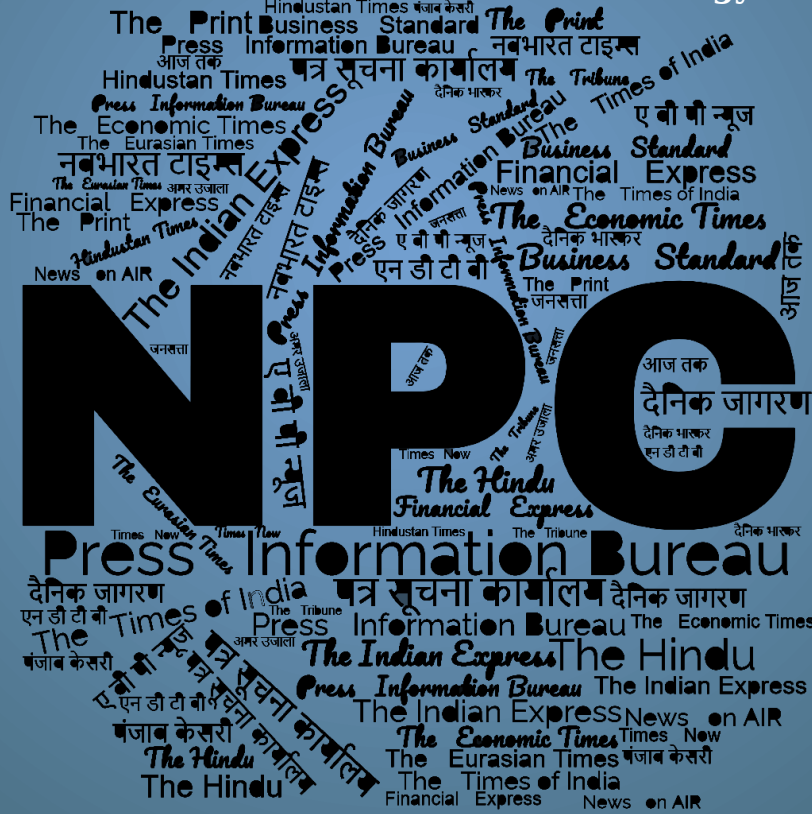
खंड/Vol. : 48 अंक/Issue : 120

27/06/2023

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Defence Strategic: National/International



Press Information Bureau
Government of India

Ministry of Defence

Mon, 26 Jun 2023

Interactive Conference & B2B Session on Indigenisation Requirements of Indian Navy: Opportunities for Industries

An 'Interactive Conference & B2B Session on Indigenisation Requirements of Indian Navy: Opportunities for Industries' was conducted by the Indian Navy in association with Federation of Indian Chambers of Commerce & Industry (FICCI) on 26 Jun 23 at Hari Shankar Singhania Commission Auditorium of FICCI, FICCI Federation House.

VAdm Sandeep Naithani, Chief of Materiel was the Chief Guest for the conference and delivered the keynote address. The conference provided an unique opportunity for industry / MSME / Startups to interact with Indian Navy personnel and provided a platform for all stake holders to collectively discuss the indigenisation plans / end requirements of the Indian Navy towards achieving of self-reliance in the defence sector.

The dedicated B2B interaction between the Indian Navy and Industry/ MSME / Startups, was held and key indigenisation requirements of the Navy were discussed as part of 'targeted round table' discussions. The conference promoted indigenisation in congruence with the 'Make in India' vision of the Government of India.

More than 100 industries / MSMEs / Startups participated in the conference.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1935337>



Press Information Bureau
Government of India

Ministry of Defence

Mon, 26 Jun 2023

National Security our Top-most Priority: Raksha Mantri Shri Rajnath Singh in Jammu

“Armed Forces being equipped with latest weaponry; fully capable of protecting national interests”

“Our policy of ‘zero tolerance against terrorism’ has altered perception of other countries”

“Pakistan has no locus standi in PoK; It is a part of India”

“Govt will never let the sanctity of our borders be violated; We believe in resolving issues through talks”

RM rejects speculative reports on pricing of MQ-9B drones deal

“Acquisition cost to be compared with price offered to other countries; Established procurement procedure to be followed”

National security is the Government’s top-most priority and it is committed to protect the sovereignty, unity & integrity of the country. This was stated by Raksha Mantri Shri Rajnath Singh while addressing a ‘National Security Conclave’ in Jammu on June 26, 2023. He asserted that India has witnessed a paradigm shift in its security scenario in the last nine years. He pointed out that India’s image in 2013-14 was that of a weak nation which allowed its adversaries to create problems, but today the country has the ability to overcome every threat.

Elaborating on the blueprint on national security, the Raksha Mantri stated that the Government, under the leadership of Prime Minister Shri Narendra Modi, has been working on four directive principles- to enable the country to deal with threats to its security & sovereignty; to take every action to protect national interests; to create safe conditions within the country to facilitate progress, improve the lives of the people & fulfil their aspirations and to build an environment with friendly countries to tackle global challenges such as terrorism unitedly.

Shri Rajnath Singh stated that no stone is being left unturned to equip the military with latest weaponry and modern technology, assuring the Nation that the Armed Forces are fully capable of protecting the borders and the seas. “Our goal is to bring our Armed Forces in the frontline of modern militaries,” he said.

“Since long time, Pakistan has tried to destabilise peace and harmony in the country through cross-border terrorism. However, when we came to power, we launched an effective action against terrorism. We showed the world the meaning of ‘zero tolerance against terrorism’. The bold and first-of-its-kind moves to eliminate terrorists following the Uri and Pulwama incidents are proof of India’s ‘zero tolerance against terrorism’ policy and the unmatched valour of the Armed Forces. Today, most of the countries are united against terrorism. The joint statement issued after the Prime Minister’s meeting with US President Mr Joe Biden is an indication of how India has changed the mind-set of the world on the issue of terrorism,” the Raksha Mantri said.

Shri Rajnath Singh added that the network of terrorism in Jammu & Kashmir has substantially weakened in the last few years as strict and consistent action is being taken. “Terror funding has been curbed. Supply of arms & drugs to terrorists has been stopped. Along with elimination of terrorists, work is being done to dismantle the network of Under Ground workers,” he said.

On the abrogation of Article 370 in Jammu & Kashmir, the Raksha Mantri stated that the decision has connected the people of the Union Territory with the country’s mainstream and helped them to usher in a new era of peace & progress.

On PoK, Shri Rajnath Singh said, Pakistan does not have a locus standi there as it has illegally occupied the area. The Indian Parliament has unanimously passed at least three resolutions, which state that PoK is a part of India, he said.

The Raksha Mantri termed the border situation with China as a matter of perceptual difference, but there are agreements & protocols, based on which the armies of both the countries carry out the patrolling. Referring to the stand-off in East Ladakh in 2020, he said, the Chinese Army ignored the agreed protocols and unilaterally tried to change the status quo on the LAC. He lauded the valour and dedication of the Indian Army which prevented the attempts by PLA to change the status quo.

Shri Rajnath Singh reiterated the Government’s stand to resolve the border issue through dialogue and in a peaceful manner. He added that the talks are continuing at military and diplomatic levels to

resolve the dispute. He assured the nation that the Government will never compromise on India's border, its honour and self-respect. "We will never let the sanctity of our borders be violated," he added. The Raksha Mantri touched upon the measures taken by the Government to bolster national security, including strengthening border infrastructure and achieving 'Aatmanirbharta' in defence. He listed out a number of steps taken to attain self-reliance, namely notification of positive indigenisation lists and earmarking 75% of defence capital procurement budget for domestic industry in Financial Year 2023-24. "India does not want to depend on imported weapons. Our national security will only strengthen when we become self-reliant in defence manufacturing. Our aim is to 'Make in India, Make for the world'. Our efforts are bearing fruit. Today, we are manufacturing tanks, aircraft carriers, submarines and various kinds of weapons. Defence exports have crossed Rs 16,000 crore from a meagre Rs 900 crore before 2014. The exports will soon touch the Rs 20,000 crore mark," he said. Shri Rajnath Singh also enumerated the structural reforms undertaken by the Government, including the appointment of Chief of Defence Staff and setting up of Department of Military Affairs. He added that the Government continues to move forward and work is being done to set up theatre commands, which will be another revolutionary reform.

The Raksha Mantri also shed light on the transformed image of India on the global stage under the dynamic leadership of Prime Minister Shri Narendra Modi. He stated that today the world keenly listens to India on international forums due to the Prime Minister's credibility on the global stage.

Shri Rajnath Singh underlined the importance of coordination with major world powers, such as the US & Russia, to protect India's security interests in this globalised world. He stated that India and US are being seen as natural allies and their strategic partnership is being further cemented.

The Raksha Mantri added that India-US defence cooperation has grown rapidly with the expansion of military-to-military engagements, information sharing and cooperation in the fields of Artificial Intelligence, cyber, space and mutual logistics support. He termed the Prime Minister's recent visit to the US as a landmark event, which ushered the bilateral defence cooperation in a new era.

Shri Rajnath Singh called for integrated and united response to deal with global threats & challenges. "India is a major regional power. Therefore, it is important for us to align our security concerns with other countries in our extended neighbourhood," he said. Shri Rajnath Singh mentioned about the General Electric (GE) Aerospace-Hindustan Aeronautics Limited deal to co-produce F-414 fighter jet engines in India. "With this deal, we will become the fourth country to manufacture jet engines. Tejas aircraft will be fitted with these Made in India engines," he said. Rejecting speculative reports on the price and other terms of purchase of MQ-9B drones from the US, the Raksha Mantri stated that the Ministry of Defence will compare the acquisition cost of the drones with the best price General Atomics (GA) offered to other countries. He added that the acquisition will be made only by following the established procurement procedure.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1935366>

THE HINDU
BusinessLine

Mon, 26 Jun 2023

Rajnath Singh Supports Growing India-US Defence Ties to Meet Global Threats

With Prime Minister Narendra Modi returning on Sunday from his four-day trip to Washington and Cairo, Defence Minister Rajnath Singh on Monday supported growing India-US defence

cooperation by stating that aligning with “extended neighbourhood” was important for a united response to deal with global threats and challenges, perhaps hinting at China.

Speaking a national security conclave in Jammu, Singh stated that India and US are being seen as natural allies and their strategic partnership is being further cemented. “India is a major regional power. Therefore, it is important for us to align our security concerns with other countries in our extended neighbourhood,” he said.

The Defence Minister termed Modi’s US visit as a “landmark event”, which he stated ushered the bilateral defence cooperation in a “new era”. It’s reflected, as per Singh, in the expansion of military-to-military engagements, information sharing and cooperation in the fields of Artificial Intelligence, cyber, space and mutual logistics support.

In his speech, Singh mentioned about the General Electric (GE) Aerospace-Hindustan Aeronautics Ltd deal to co-produce F-414 fighter jet engines for LCA MK-II in India. “With this deal, we will become the fourth country to manufacture jet engines. Tejas aircraft will be fitted with these Made in India engines,” he said.

Singh joined his Ministry in rejecting speculative reports on the price and other terms of purchase of 31 MQ-9B drones from the US-based General Atomics. The Ministry of Defence will compare the acquisition cost of the drones with the best price General Atomics (GA) offered to other countries, the Minister stated. He too insisted that the acquisition will be made only by following the established procurement procedure.

On the stand off with China, the Defence Minister termed the border situation with China as a “matter of perceptual difference”. There are agreements and protocols, based on which the armies of both the countries carry out the patrolling and the Chinese Army ignored them and unilaterally tried to change the status quo on the LAC in eastern Ladakh, he stated while referring to the stand-off in 2020, he said. He, however, lauded the valour and dedication of the Indian Army which prevented the attempts by PLA to change the status quo.

The Minister reiterated the Government’s stand to resolve the border issue through dialogue and in a peaceful manner. The talks are continuing at military and diplomatic levels to resolve the dispute and assured the nation that the government will never compromise on India’s border, its honour and self-respect.

<https://www.thehindubusinessline.com/news/rajnath-supports-growing-india-us-defence-ties-to-meet-global-threats/article67012288.ece>

ThePrint

Mon, 26 Jun 2023

Talks on with China to Resolve Border Issues in Peaceful Manner: Defence Minister

Defence Minister Rajnath Singh on Monday said the government will never let the sanctity of India’s borders be violated and talks are going on at military and diplomatic levels with China to resolve issues in a peaceful manner.

Addressing a national security conclave here, Singh said there have been perceptual differences between India and China on the boundary issue for a long time.

“I want to repeat that there have been some activities on the LAC since 2013, but I outrightly reject (claims) that there has been any significant change or encroachment on the LAC after our government was formed,” Singh said.

Paying glowing tributes to soldiers martyred in Galwan Valley in eastern Ladakh in 2020, the minister said the Chinese Army ignored the agreed protocols and unilaterally tried to make some changes on the Line of Actual Control (LAC).

He lauded the valour and dedication of the Indian Army which foiled attempts by the Chinese PLA to change status quo and said the country will remain indebted to the brave soldiers for their sacrifice and their courageous feat in Galwan will be remembered with pride by future generations.

“We are pained when attempts are made to question the bravery of the soldiers to corner the government. The people of the country are proud of their armed forces,” he said, He said India wants the resolution of issues with China through peaceful means.

“The talks are going on at military and diplomatic levels. We want to assure you that we will not compromise on India’s border, its honour and self-respect.

“We will never allow violation of the sanctity of our borders,” the defence minister said, adding that the government has learnt from the 1962 war with China and has focused on building border infrastructure.

He said the border residents are the “strategic assets” for the country and the government wants people to settle in the forward villages and is undertaking massive infrastructure development works for their benefit from Ladakh to Arunachal Pradesh.

“Rohtang tunnel (on Leh-Manali Highway in Himachal Pradesh) was constructed by our government which completed the project pending for 26 years in six years. This Atal tunnel is very strategic in nature as it will facilitate movement of our troops (round-the-year),” he said.

Border Roads Organisation (BRO) is constructing roads in Ladakh, which will also benefit the border residents, he said, adding massive border infrastructure development projects have also been undertaken in other border areas in Jammu and Kashmir, Himachal and Arunachal Pradesh.

“The border infrastructure is imperative from a security perspective. The border residents are our strategic assets and their interests are paramount to us. We want people to settle in the border village, construct their homes and live there,” he said.

<https://theprint.in/india/talks-on-with-china-to-resolve-border-issues-in-peaceful-manner-defence-minister/1643435/>



Mon, 26 Jun 2023

India's National Security Advisor Ajit Doval in Oman to Hold Key Talks

India's National Security Advisor Ajit Doval is on a day-long visit to Oman today, aiming to bolster strategic cooperation and security ties between the two nations. Doval's visit comes as part of an increased high-level engagement witnessed between India and Oman in recent years, emphasising the significance of their partnership in West Asia. Indian NSA called on His Majesty Sultan

Haitham bin Tarik and delivered a personal message of greetings from Prime Minister Narendra Modi.

During his visit, Doval is scheduled to hold talks with his Omani counterparts, the Minister of the Royal Office, and the foreign minister. The discussions are expected to encompass a range of crucial areas, including defence, counter-terrorism, and maritime security cooperation. Oman and India, both maritime neighbours sharing the coastline of the Arabian Sea, have collaborated closely to ensure stability and safety in the Indian Ocean region.

Earlier this year, the two countries held the 8th strategic dialogue in Delhi, led by India's Deputy National Security Adviser Vikram Misri and Oman's Secretary General of the National Security Council, Major General Idris Abdulrahman Al-Kindi. These dialogues have reinforced the foundation of trust and cooperation between the two nations.

Furthermore, the growing economic ties between India and Oman have played a pivotal role in strengthening their relationship. India has emerged as one of the largest investors in Oman, with total investments exceeding US\$7.5 billion. Bilateral trade has witnessed a significant surge, with trade volume crossing 12bn in 2022-2023.

India's invitation to Oman to participate in the G20 Summit and associated meetings as a guest country during its ongoing presidency of the grouping reflects the importance India places on its relationship with Oman. The meeting between the top security officials from India and Oman is expected to yield significant outcomes, paving the way for a stronger partnership between the two nations in the face of evolving regional and global challenges.

<https://www.wionews.com/india-news/indias-national-security-advisor-ajit-doval-in-oman-to-hold-key-talks-608832>



Tue, 27 Jun 2023

Indian MSMEs: Decoding Atmanirbharta in Defence Sector

Geopolitical tectonic plates are beginning to shift. The Russia-Ukraine crisis has exposed globalisation's fracture points and the most significant lesson for countries has emerged is to become self-sufficient as a nation, particularly in vital sectors.

India, the world's largest importer of weaponry, accounts for 11 per cent of total global imports and is heavily reliant on countries such as Russia, France, Israel and the United States in the defence sector. As the Ukraine crisis raised concerns about the necessity for self-reliance in defence technology, India's indigenisation activities have accelerated. So far, India has announced four "positive indigenisation lists" which include over 1,000 items that will not be imported and will be manufactured in India.

The lists mention platforms such as naval utility helicopters (NUH), medium altitude long endurance (MALE) UAVs, lightweight tanks and unmanned underwater vehicles to high-end sensors such as the multi-function surveillance, track and guidance radar (MFSTAR) and various missile systems. India has set out on an ambitious journey to build a massive military engineering infrastructure over the next decade including Uttar Pradesh and Tamilnadu defence corridors.

Opportunities for the Indian industry are also plentiful. According to some estimates, orders for defence equipment worth over Rs 2.10 lakh crore will be placed in the Indian industry during the

next five to seven years. Because technology is an essential component of all military equipment, the Indian technology industry – engineering services firms, IT services firms and technology startups – is set to benefit greatly from this indigenisation initiative.

The Role of Indian Companies and Startups

The Indian government's focus on technology transfer (ToT) with foreign defence companies is expected to benefit the local ecosystem. Notably, in the last two years, the DRDO (Defence Research and Development Organisation) has entered into around 1,430 ToT agreements with Indian companies, 450 of which have been inked.

Indian engineering services firms such as L&T Technology Services, Persistent Systems, Cyient, Tata Elxsi and all significant Indian IT services firms are collaborating with numerous multinational defence conglomerates in the United States and Europe. The policy push will assist these enterprises in better accessing the local market.

Not only established firms, but startups are also increasingly playing a significant role in making the country self-reliant in defence technology. Since 25 per cent of the budget for research and development (R&D) in defence has been reserved for industry, startups and academia in this year's budget, it is expected to give a big push towards innovation.

Co-founder and CEO of Pune-based Sagar Defence Engineering, Nikunj Parashar said that the MSME in the defence sector drive growth through niche technologies, adaptability and agility and aims at bringing specialised skills and new solutions by investing in R&D and utilising government support.

Parashar shared his insight and said, "Our indigenous manufacturing skills enable us to create advanced technologies, components and subsystems in-house, contributing to the Aatmanirbhar Bharat initiative and further reducing the nation's dependency on imports."

To have long-term success through innovation and teamwork, collaborative initiatives assist MSMEs in building resilience and also create social and environmental consequences and ensure long-term commercial success in the defence sector, he added.

Whereas Nasir Shaikh, Group CEO at the Lexicon Group of Institutes, Multifit, Educrack & Easy Recruit Plus believes that MSMEs are vital for India's defence sector, which contributes through manufacturing, technology development, exports and research collaboration.

He also believes that MSMEs benefit from offset obligations by partnering with foreign companies and gaining access to advanced technologies and business opportunities.

"MSMEs contribute to defence exports, boosting production and foreign exchange earnings. The government supports MSME participation through dedicated defence corridors, incentives, simplified procurement and showcasing platforms. A classic example is in the development and the technological advances made with drones and their utilisation by the defence services, Shaikh added.

The global order is expected to see a significant change in the coming years. As a middle power with two nuclear-armed neighbours, India doesn't have the luxury of depending on any other nation for critical defence technologies. As the Ukraine war shows, every nation has to fight its war alone.

So, it's better to indigenise defence technology at a faster pace than to put our national security hostage to other nations' whims.

<https://www.businessworld.in/article/Indian-MSMEs-Decoding-Atmanirbharta-In-Defence-Sector-/27-06-2023-481546/>

Defence Reforms: The Pursuit of Jointness and Talent Pipelines for Modern Combat's Technological Sword-Arms

By Raj Shukla

The Indian Armed Services' Jointness Paradigm received a major boost with the setting up of the Chief of Defence Staff and Department of Military Affairs (CDS/DMA) in early 2020. The decision was a game changer with many viewing the reform as more powerful than America's Goldwater-Nichols Act of 1986 that reorganised the US military.

One of the key objectives of the institution (CDS/DMA) is to foster jointness through the three services and more importantly – drive comprehensive change through the National Security System. While some steps have been taken, many more are in the offing – from cross-postings across the three services to the creation of Theatre Commands, symbolising the myriad, structural and cultural corrections that the Indian military needs, if it is to tight fit into the wider national security makeover that is underway.

Long Road To Jointness

The “Jointmanship” challenge is humongous and will take decades to attain finality. Just to get a sense, we in India today have a CDS, quite like the Permanent Chairman of the Joint Chiefs of Staff, which the Americans appointed way back in 1949.

We are therefore merely in a state of bare tri-service coordination, we are yet to dissolve many barriers and pass through multiple gateways – the phases of networked jointness (what the American military demonstrated in Gulf War 1), full fledged operational integration (akin to Gulf War-2 proficiencies), cross-pollination of talents and attributes from across diverse domains, development of multi-domain capacities, transition to digital combat and finally civil-military fusion (the current strategic buzzword and global best practice).

The key driver of such a roadmap is the realisation that national security today is so complex that no single institution or domain can deliver on its own. So, not only the military but a whole range of other actors, namely diplomats, the scientific community, technologists, the private sector, startups, domain specialists, all need to come together in the national security enterprise.

The ambit of jointmanship has expanded over time – today it is a saga of structural corrections, wide ranging cultural embrace and technological evolution.

The Indian project of jointmanship is being driven at two levels: the small, incremental steps (low hanging fruit) as also the more complex challenges that demand comprehensive transformation. While the former are utilitarian, the latter are far more critical, to meet the formidable China challenge as also to be in lockstep with India's growing weight and influence.

In so far as the incremental challenges are concerned there are a host of measures that are being/could be taken. The objective is to grow a cadre of officers bedrocked in single service proficiencies, schooled in integrated combat, as also professionals with a wide-angled view of national security.

The concept of cross-postings which has been in vogue for long, is being invigorated and scaled up further. Other measures like appointment of civilian faculty in military institutions of professional

learning, a joint curriculum at the Defence Services Staff College, a Joint Higher Command Course, will also be useful.

The Larger Transformations

With regard to the larger transformations, the creation of two adversary-specific Joint Commands and one Maritime Theatre to secure our seaward aspirations must be executed with speed. We also need a Multi-Domain Command wherein our capacities in space, electronic warfare, cyber, long-range precision fires and critical emerging technologies could be sewed into the traditional domains.

The Army Training Command (ARTRAC) could be re-structured as a Joint Command focusing on Strategic-Military Futures and for driving cutting-edge military innovation through the field force. The Theatre Commands should be headed by four-star generals with the present CISC (Chief of Integrated Defence Staff to the Chairman, Chiefs of Staff Committee) being re-designated as a four-star Vice-Chief of Defence Staff (VCDS) with a four-year tenure, tasked with resolution of day-to-day disputes, leaving the CDS free to shape events in the strategic-military realm. The CDS should be the final arbiter on all matters joint, with a decisive vote on all 3 star promotions and above.

In modern combat – the squadron and company battles, the blood and the gore, ride a very strong technological backbone. The deep technologies needed to steer the latter necessitate the leveraging of the private sector into warfighting. Elon Musk (Starlinks), Peter Thiel (Palantir) and Microsoft (cyberwarfare), are, after all, decisive actors in the Ukraine conflict. Along with structural corrections, the Indian project needs major cultural transitions; new talent pipelines to drive proficiencies in niche domains.

Jointmanship is a critical facet of the Indian military's larger, broader, transformation into an integrated, calibrated, technologically enabled and ready, instrument of force; one structured & designed to secure India's inevitable rise. We must pursue, both, jointmanship and the wider transformation, with equal diligence, wisdom and resolve.

<https://www.moneycontrol.com/news/opinion/defence-reforms-the-pursuit-of-jointness-and-talent-pipelines-for-modern-combats-technological-sword-arms-10862551.html>



Tue, 27 Jun 2023

After 'Historic Kill' by Artificial Intelligence Powered UAV, will Unmanned Aircraft Systems Overpower Manned Fighters

By Group Captain Arvind Pandey(Retd)

Air warfare is evolving continuously due to Unmanned Aircraft Systems (UAS). UAS, according to military experts, are more accurate than manned aircraft, allowing for little attrition while keeping pilots safe.

UAS are criticized for being unethical and frequently killing innocent individuals while frightening society on the ground. However, as they get quicker and more resilient, they are also being employed more and more on the battlefield, resulting in a hypermodern conflict where these are essential for fighting, surveillance, and reconnaissance tasks.

Ukraine-Russia's ongoing conflict has thrown up this challenge for global military analysts. It is also observed that disruptive technologies like artificial intelligence (AI) might herald a future in which most military confrontations are managed remotely, possibly even by AI.

Utilization Of UAS

Over the past decades, military forces have successfully used UAS to perform various tasks, which include:

- **Intelligence, Surveillance, and Reconnaissance:** This refers to collecting and disseminating intelligence information.
- **Close Air Support:** This refers to neutralizing enemy ground forces close to the battlefield.
- **Logistics Support:** This refers to transferring men and material on the battlefield to support operations.
- **Communications:** This refers to increasing communication connectivity for enhanced operational reach.

Military analysts argue that UAS could further replace manned aircraft for several missions, which may include:

- Aerial Refueling
- Air-to-Air Combat
- Suppression and Destruction of enemy air defenses
- Combat Search and Rescue
- Electronic Warfare

Some of the arguments that must be put in immediately for the understanding of employability in respect of both platforms are as follows:

Advantages And Disadvantages Of Manned Aircraft Systems

Piloted Control: Manned aircraft have the advantage of having a pilot who can make real-time decisions and adapt to changing situations. Pilots can assess the environment, exercise judgment, and respond effectively to dynamic combat scenarios.

Complex Missions: Manned aircraft are typically better suited for challenging missions that require human expertise, such as air-to-air combat, close air support, and sophisticated target identification and engagement.

Crew Interaction: Manned aircraft allow for direct human interaction within the aircraft, facilitating coordination, communication, and collaboration among the crew members, enhancing their situational awareness and decision-making abilities.

Psychological Impact: The presence of human pilots can have psychological effects on adversaries, making manned aircraft effective for deterrence and influencing perceptions on the battlefield.

Advantages And Disadvantages Of Unmanned Aircraft Systems

Aircraft Performance/persistence and Endurance: The ability of UAS for continuous availability and sustained endurance has the edge over manned aircraft due to its performance.

Risk Tolerance: The risk-taking capability of UAS goes beyond comprehension when compared with crewed aircraft since they are expendable.

Cost of operations: The overall cost of operations gives an edge due to its self-sustainability and limited support required during operations.

Personnel implication: The most crucial thing of non-involvement of pilots during actual flying waves of this requirement regarding capability and expertise in sensitive missions.

Artificial Intelligence intervention: This disruptive technology is preparing itself to change the nature of warfare. The roles which will be affected are:

Combat mission support/collaborative combat aircraft/ manned-unmanned teaming

Autonomous dog fighting

Swarming

How AI Is Entering Air Warfare

The Libyan opposition troops were attacked by a quadcopter that weighed 15 pounds and was made in Turkey, according to a report by the UN.

It would have been the “first known case of artificial intelligence-based autonomous weapons being used to kill” if anybody had perished in that March 2020 attack.

The drone, known as a lethal autonomous weapons system — or LAWS — attacked humans without approval from its operator. The 548-page report claimed that the AI drone – a Kargu-2 quadcopter, attacked the fleeing troops.

According to author Paul Scharre, the finest weapons systems blend computer intelligence with human intelligence to produce hybrid cognitive structures that use both advantages.

He also says using a cognitive structure like this can produce greater results than relying only on people or AI.

He claims that using human and machine cognition in engagement decisions may provide automation’s accuracy and dependability without compromising human flexibility and robustness.

The only way to stop autonomous weapons from acting against their operators due to erroneous reasoning, software bugs, or adversary intervention may thus be to design human-in-the-loop systems architecture.

UAS And Geopolitics

The primary benefit of UAS is their value as instruments for governments. Without any significant human involvement, UAS may produce an immediate effect. The Clausewitzian axiom that “the war is a continuation of politics by other means” best describes the relationship between war and politics now more than ever.

One of the biggest benefits of future warfare is that it will reduce the casualties caused by sending a machine on tasks that would typically need troops or human pilots.

How UAS Are Changing Air Warfare

UAS operations by American forces in Afghanistan, Pakistan, or Yemen are covert, targeted killings that resemble hunting more than bombings on military objectives.

For instance, the fight between Armenia and Azerbaijan in 2020 demonstrated how unmanned platforms might overwhelm and subjugate conventional platforms utilized by conventional militaries.

However, how drones are utilized in Ukraine contrasts sharply with how the US has employed them in the fight against terror. Both sides in the conflict in Ukraine operate drones as tactical tools for various operations, including battlefield reconnaissance, artillery spotting, and assaulting armored vehicles and missile launchers.

What Lies Ahead

It's worth noting that the combination of armed and unarmed aircraft will probably be used to fight tomorrow's war, each combining its abilities. To benefit from the advantages of both types of airplanes, integrated systems are being designed which operate in conjunction with unmanned platforms.

It could enhance tactical situational awareness and the lethality of the manned platforms while improving their survival chances. The innovative concept of action could revolutionize future warfare planning and conduct, giving importance to the concept of interoperability between connected systems.

China, Russia, and US are continuously developing and testing the concept of collaborative combat aircraft and manned-unmanned teaming.

In the Indian context, this concept is being developed as Combat Air Teaming System (CATS) by Hindustan Aeronautics Limited (HAL) in collaboration with Defense Research and Development Organization (DRDO), National Aerospace Laboratories (NAL) & a Bengaluru-based private start-up, Newspace Research & Technologies.

Given the opening up of the Indian private sector in defense manufacturing, there is a need to ensure the timely completion of this project as envisaged for taking Indian defense capability to a new frontier.

<https://eurasianimes.com/after-historic-kill-by-artificial-intelligence-powered-uav-will/>

Science & Technology News

THE ECONOMIC TIMES

Tue, 27 Jun 2023

Indo-US Partnership Soars on Outer Space Alliance

By Jitendra Singh

Prime Minister Narendra Modi's just concluded visit to the USA has instantly gone down in history as it establishes India as a major global player in the years to come. As India and the US usher in an era of technology driven equal collaboration, it marks the beginning of a journey about which the PM aptly put it, "Sky is not the limit."

Indeed, the credit goes to Prime Minister Modi who, during the last nine years, took a series of unorthodox and path-breaking decisions which enabled India to achieve a quantum jump in key areas, as a result of which, for example, the US, which had begun its space journey several years before India, today solicits India as an equal partner in its future endeavours.

During a ceremony at the Willard Inter-Continental Hotel in Washington on June 21, India became the 27th country to sign the Artemis Accords.

The Artemis Accords establish a practical set of principles to guide civilian space exploration cooperation among nations for peaceful purposes. It enables India to participate in the US-led Artemis programme for exploration of the moon and other celestial objects. Significantly, the pact will pave the way for easing restrictions on import of critical technologies in the space domain, especially electronics, benefitting Indian companies to develop systems and innovate for US

markets. It will also facilitate participation of India in more scientific programmes jointly, allow access to common standards for long-term engagements in activities including human spaceflight programmes and stronger engagements with the US in more strategic areas including micro-electronics, quantum and space security.

The Artemis Accords is a non-binding agreement with no financial commitments. It was signed on October 13, 2020, by eight founder nations - Australia, Canada, Italy, Japan, Luxembourg, UAE, UK and the United States. Its members include the traditional US allies such as Japan, France, New Zealand, UK, Canada, South Korea, Australia and Spain while African nations like Rwanda and Nigeria are the new partners.

Let us try to understand how India will stand to gain by joining the Artemis Accords. According to an estimate, global government expenditure for space programmes hit a record of approximately \$103 billion last year. With almost \$62 billion, the US government spent more than half of the total. The US was followed by China, with almost \$12 billion, which is not part of the consortium, as also Russia, which ranks fifth with an annual spending of \$3.4 billion. India ranks seventh with an annual budget of \$1.93 billion.

Let us also try to compare the space programmes of various nations by the number of orbital launches in 2022. PayloadSpace website says 186 orbital launches were attempted last year, with 76 by the US, 62 by China and 21 by Russia, while India made five orbital launches. Now, let us compare the third key parameter, viz. number of satellites in space. As of May 4, 2023, the satellite tracking website Orbiting Now lists 7,702 active satellites in various earth orbits. The US has the highest 2,926 operational satellites, followed by China (493), UK (450) and Russia (167), while India ranks eighth with 58 satellites.

India's space programme is six decades old, and the Indian Space Research Organisation (ISRO) came into being seven years later in 1969. International cooperation has been its hallmark, with ISRO collaborating with various launch agencies such as Russia's Roscosmos and Europe's ESA, while ISRO has launched more than 385 foreign satellites from over 34 countries.

Before 2014, ISRO used to undertake launches now and then, but after PM Narendra Modi opened the doors of the space sector to private sector participation, today ISRO is working with nearly 150 private startups. Deep space missions require billions of dollars and benefit humanity at large; it is only imperative that nations pool in their resources for the benefit of humankind. Without losing time, like-minded nations have to move on, collaborate and work on each other's gains and experiences and as PM Modi stresses that "we must not work in silos".

We may not have to wait long to witness the first major explicit gain of the newfound India-US camaraderie in the space sector. An Indian astronaut may be sent to the International Space Station (ISS) next year. US President Joe Biden confirmed this in the White House after a meeting with Prime Minister Modi on June 22.

The joint statement by India and the US during PM Modi's visit said the National Aeronautics and Space Administration (NASA) would provide "advanced training" to Indian astronauts at one of its facilities.

Other sectors too will see a leap in mutual gains. US memory chip firm Micron Technology, Inc said it would invest up to \$825 million in a new chip assembly and test facility in Gujarat, its first factory in India. Total investment in the facility will be \$2.75 billion, with support from the Union government and the Gujarat government.

President Biden and PM Modi also agreed to the establishment of a joint Indo-US Quantum Coordination Mechanism to facilitate collaboration among industry, academia and government, and work towards a comprehensive Quantum Information Science and Technology agreement. A \$2

million grant programme is being launched under the US-India Science and Technology Endowment Fund for the joint development and commercialisation of artificial intelligence (AI) and quantum technologies, and to encourage public-private collaborations to develop high performance computing (HPC) facilities in India.

President Biden also reiterated his government's commitment to work with the US Congress to lower barriers to US exports to India of HPC technology and source code. The US side pledged to make its best efforts in support of India's Centre for Development of Advanced Computing (C-DAC) joining the US Accelerated Data Analytics and Computing (ADAC) Institute. In addition, 35 innovative joint research collaborations in emerging technologies will be funded by the US National Science Foundation and India's Department of Science and Technology.

President Biden assured the US support for India's leadership as chair of the Global Partnership on AI. The two leaders applauded Google's intent to continue investing through its \$10 billion India Digitisation Fund, including in early-stage Indian startups.

India's Department of Atomic Energy will make a \$140 million in-kind contribution to the US Department of Energy's Fermi National Laboratory toward collaborative development of the Proton Improvement Plan-II Accelerator, for the Long Baseline Neutrino Facility - the first and largest international research facility in the US.

In the health sector, research institutes of both countries will collaborate on affordable cancer technology programmes, including for the development of AI-enabled diagnostic and prognosis prediction tools, and on diabetes research.

Giving wings to India's civil aviation sector, Air India will buy 220 Boeing planes for \$34 billion. The most apparent sign of India-US ties being at their best is that, as PM Modi mentioned in his address to the US Congress, the US is today not only India's largest trade partner but the defence sector collaboration reflects the trustworthy relationship.

To conclude with the closing sentence of the joint statement issued at the end of PM Modi's US visit, "Our (India and US) ambitions are to reach ever greater heights..."

<https://economictimes.indiatimes.com/news/india/view-indo-us-partnership-soars-on-outer-space-alliance/articleshow/101288553.cms>



Mon, 26 Jun 2023

Chandrayaan-3 Spacecraft Ready to be Encapsulated into Rocket, Says ISRO

Indicating steady progress towards a mid-July launch, the Indian Space Agency, ISRO shared pictures of its third lunar spacecraft Chandrayaan-3, which has now been mated with the payload adapter. The payload adapter is a piece of hardware that is used to connect the satellite (payload) to the upper stage of a rocket. Once a satellite is mated with the payload dispenser, it is then encapsulated within the payload fairing (nose cone of the rocket) and then stacked onto the launch vehicle.

Dr S Somanath, Chairman, ISRO told WION that the Chandrayaan-3 lander and rover would retain the names used in Chandrayaan-2. This implies that the Lunar lander will be known as 'Vikram', a tribute to Dr Vikram A Sarabhai, the brain behind the Indian space programme. The rover will be known as 'Pragyan', a Sanskrit word that means wisdom. Launched in mid-July, the spacecraft would make a lunar landing towards the end of August, Dr Somanath added.

India is undertaking its third lunar mission and second lunar landing attempt, after the previous mission Chandrayaan-2 could not perform the lunar soft landing. While barely two kilometres above the lunar surface, as it was approaching a vertical landing, ISRO lost contact with the then 'Vikram' lunar lander.

The lander had made a hard landing on the lunar surface, which it did not survive, thus leaving the lunar landing mission incomplete. However, the orbiter from Chandrayaan-2 continues to circle the moon and provide science data from its payloads. Therefore, Chandrayaan-3 will not be having an orbiter that is mounted with multiple science payloads. Instead, it will serve as a propulsion module that will help the integrated spacecraft reach the lunar orbit.

The Chandrayaan-3 orbiter weighs lesser than its predecessor. However, the payload mass reduced from the orbiter has been added to the Chandrayaan-3 lunar lander. This time around, ISRO had ruggedised the lander, placed larger solar panels for better power generation, added more fuel that can be used for manoeuvring, undertaken measures for failure tolerance and increased the scientific payloads.

The added mass on the lunar lander comprises more fuel, more ruggedisation, measures for failure tolerance and strengthening of landing legs and increased scientific payloads, larger solar panels for better power generation," Dr S Somanath, Chairman, ISRO told WION. He was responding to WION's question on whether the Chandrayaan-3 spacecraft would weigh lesser than its predecessor (which weighed around 3.6 tonnes or 3,600kgs).

Earlier, the Chairman of ISRO had told WION that the launch window for Chandrayaan-3 on board the LVM3 rocket would be between the 12th and 19th of July. The launch window is the ideal period for a launch mission and any day within that interval would be chosen based on a host of factors.

Given that the Indian lunar spacecraft would require around six weeks to travel from the earth to the moon (a distance of 3,84,000 kms), precise calculations are carried out and the launch time is determined down to the minute. When determining the time of launch, the mission planners consider the weather forecast, a flight path that is free of space debris, the dynamic position of the destination(with respect to Earth), the time taken to travel to the destination, the manoeuvres involved, the rocket being used, the purpose of the mission, the movement and impact of other heavenly bodies etc.

Queried about how confident the positive mission outcome of Chandrayaan-3 is, Dr Somanath had told WION that he is always confident, but space is an unforgiving domain, where only rigorous testing and clear decision-making yield favourable results. Smilingly, making a mention of luck being involved, he said that "even luck comes out of hard work and the perseverance to do the right thing at the right time".

<https://www.wionews.com/india-news/chandrayaan-3-spacecraft-ready-to-be-encapsulated-into-rocket-says-isro-608988>

