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"In order to assure an adequate national defense, it is necessary — and sufficient — to be in a position in case of war to conquer the command of the air."

— General Giulio Douhet

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Indian Space Programme More Advanced Than Chinese, Says Veteran Scientist

Bhaswati Guha Majumder| 13 July 2021

Source: Swarajyamag | https://swarajyamag.com/science/indian-space-programme-more-advanced-than-chinese-says-veteran-scientist

Padma Shri awardee Prof R M Vasagam, who is a veteran space scientist, said during the 40 years celebration event of the Ariane Passenger Payload Experiment (APPLE) satellite in space that Indian's space programme is much more advanced than the Chinese. During the event, which was organised by Chandigarh University to celebrate the success of India's first experimental communication satellite, Prof Vasagam received the Lifetime Achievement Award for his contribution to the Indian space programme.

On June 19, 1981, the APPLE satellite was launched into GTO (Geosynchronous Transfer Orbit) by the third development flight of European Space Agency's (ESA) Ariane vehicle from Kourou. It was propelled into Geosynchronous Orbit (GEO) by the Indian Space Research Organization's (ISRO) apogee motor derived from the fourth stage motor of the SLV-3. Designed and built in just two years with limited infrastructure in industrial sheds, APPLE provided ISRO with valuable hands-on experience in designing and developing three-axis stabilised geostationary communication satellites, as well as in-orbit raising manoeuvres, appendage deployment in orbit, station keeping and so on.

The event, which was conducted virtually, was attended by Prof Mylswamy Annadurai, a space scientist who is known as Moon Man of India, Dr Manpreet Singh Manna, who is the Chairman IEEE Photonics Society and Dr L V Muralikrishna Reddy, the President BRICS FEO, as well as Prof Vasagam, who was the project director of APPLE. The virtual celebration also allowed many students of the university to take part.

The Indian space programme and the research conducted by ISRO are much more advanced than the Chinese space agencies.

However, while speaking at the event, Prof Vasagam said: "The Indian space programme and the research conducted by ISRO is much more advanced than the Chinese space agencies as we have indigenously developed the technology and have not been dependent on other countries." In response to a question about China's competition in the field of space technology, Prof Vasagam stated that

Chinese youth are spearheading space missions such as Mars Rover, as well as Moon Mission, and if India wants to counter China's competition, its youth must come forward and choose Aerospace Engineering as a career.

He also stated that "Robotics is playing an important role in space technology and in future, the field of robotics would be contributing bigtime in the futuristic space exploration missions so pursuing a career in the emerging fields of Artificial Intelligence, Machine Learning and Mechatronics will open multiple avenues for Indian Youth".

We have indigenously developed the technology and have not been dependent on other countries, says Padma Shri awardee Prof R M Vasagam.

Additionally, Prof Vasagam said that to remain competitive in the space technology market, India must offer cost-effective solutions to countries that may have the capacity to run a space programme but need more resources to fulfil future requirements. While talking about the APPLE project, he said that it opened a door of opportunity for India because it was crucial for the country's telecommunication network to be established, and it also played a role in the development of futuristic communication satellites such as INSAT, which placed India among a select group of countries with its own constellation of communication satellites.

Not only Prof Vasagam but also Dr Annadurai pointed out the possibilities of India's space missions. He stated that country's space programme is progressing well, adding that India is outperforming China in areas such as remote sensing and space exploration. Additionally, Dr Singh said: "The launch of APPLE satellite was just the beginning of the success of Indian space programme and if we look today India has successfully launched more than 300 satellites".

Chandigarh University, which organised the event, is the first university in North India to offer a course in Satellite System Design and Building. Prof Vasegam praised the university's efforts in the field of science and technology, particularly in the aerospace engineering sector, since the university is now working on the building of a Student Communication Satellite that would be put into orbit by 2022.

Indecisiveness impedes military modernization

Amit Cowshish | 20 July 2021

Source: Financial Express | https://www.financialexpress.com/defence/indecisiveness-impedes-military-modernisation/2293986/

The inability of the Ministry of Defence (MoD) to find a quick way out of logjams in procurement programmes has caused more damage to the military's modernisation drive and the country's prestige than the combined effect of Byzantine procedures, bureaucratic lethargy, financial constraints, and occasional allegations of corruption.

Instances of the vendors' bids being kept in prolonged suspended animation or the Requests for Proposal (RfP) being retracted several years after these are issued, only to be re-issued and, in some cases, to be re-retracted, abound.

The red flag recently raised by the Indian Army (IA) and Indian Navy (IN) over delay in replacing Cheetah-Chetak helicopters of the 1960s' vintage is a grim reminder that boastful claims of reforms in the policy and procedures governing acquisition of defence materiel have failed to deliver as the internal processes of the MoD and the Services Headquarters (SHQs), both of which work in tandem to build up the military capabilities, continue to be marred by indecisiveness.

More than fifteen years after the 'Make' procedure was evolved by the MoD to encourage indigenous design and development of prototypes of futuristic equipment by the Indian industry, not a single development contract has been awarded. No deal has also been finalised under the 'Strategic Partnership Model' introduced in 2016 for indigenous production of aircraft, helicopters, submarines, and armoured fighting vehicles by the Indian industry with technology transfer from the foreign manufactures.

It has been a decade since MoD took the bold step of allowing the foreign companies to select the Indian Production Partner on their own from the private sector for manufacturing a transport aircraft in India to replace the Avro-fleet. However, the Airbus-Tata combine's Rs 15,000 crore bid for manufacturing C-295 military transport aircraft in India remains in limbo even after it was reported by the media in February this year that the offer was about to be approved by the Cabinet Committee on Security.

The ongoing Cheetah-Chetak replacement project is of a piece with these random examples of indecisiveness, as the MoD has nothing concrete to show for more than two decades of labour to acquire 498 Light Utility Helicopters (LUHs) to replace the ageing fleet whose extended technical life would expire 2023 onward, and to create parallel capacity for aircraft manufacturing in the private sector.

Meanwhile, after two failed attempts to meet the scaled-down requirement of 197 helicopters, an inter-governmental agreement (IGA) was signed with Russia in 2015 and a joint venture (JV) between the state-owned Hindustan Aeronautics Limited (HAL), and Rostec Corp/Russian Helicopters was also set up, to acquire 40 twin-engine Kamov-226T helicopters in a fly-away condition and to build another 160 in India, of which 135 were to be for the IA

and the remaining 65 for the Indian Air Force (IAF).

According to some sources, the project is stuck six years after it was conceived because India wants a higher indigenous content in the helicopters that are to be made in India, than what Russia is prepared to offer. This is not the first time that a badly needed project is stuck because of the disagreement over the extent of indigenisation or workshare between the foreign original equipment manufacturer (OEM) and the Indian production agency.

Instances of the vendors' bids being kept in prolonged suspended animation or the Requests for Proposal (RfP) being retracted several years after these are issued, only to be re-issued and, in some cases, to be re-retracted, abound.

Acquisition of 126 medium multi-role combat aircraft -of which 18 were to be imported in a fly-away condition from Dassault Aviation of France and the remaining 108 made in India by HAL- too remained stuck largely because of the wrangling over the workshare between them before it was unceremoniously abandoned in 2015.

While the MoD wants the equipment manufactured in India to have a high percentage of indigenous content -normally in the range of 50% to 60%- some OEMs assert that the Indian industry is often unable to absorb the technology offered by them. The Indian vendors, of course, deny it, but many admit privately that achieving higher levels of indigenisation in the locally manufactured equipment is a tall order. No wonder then that there are unconfirmed reports of the contractually stipulated percentage of indigenous content being reached in some cases through clever accounting.

The argument that local production of equipment saves foreign exchange, despite all the problems mentioned above, is valid. However, in some cases this advantage is nullified by the higher cost of local production of foreign-origin equipment. This is exemplified by Ka-226T helicopters which are estimated to cost around $11 million apiece, if made in India, against the per unit import cost of $6 million.

The present approach of realising the nebulous goal of Atmanirbharta, or self-reliance, in defence production by insisting on increasing levels of indigenous content in the locally manufactured equipment is flawed for it compels the vendors to focus largely on indigenisation of parts, components, assemblies, and sub-assemblies, and not the critical technologies that go into its production. Denial of these technologies by the foreign manufacturers in crisis situations can jeopardise self-reliance.

Four things are required for achieving better results. First, a composite policy for indigenous design and development of

major equipment and platforms which focusses on development of critical technologies and special military-grade metals and alloys. Second, an overarching organisation to coordinate the efforts currently being made disjointedly by several agencies like the Services' Indigenisation Directorates and the Defence Research and Development Organisation. Third, an appropriate funding mechanism for research, design, and development. Fourth, and most importantly, the capability to take quick decisions to wrap up the procurement cases. All this is missing at present.

This is how Indian defence can really deter China

Raja Menon | 24 July 2021

Source: The Indian Express | https://indianexpress.com/article/opinion/columns/this-is-how-indian-defence-can-really-deter-china-7419386/

Can India afford a million-man army? Apart from being a question to be answered by strategists, this question is an emotive one. This is because, as every Indian will aver, the most respected national institution is the Indian army. This question, however, arose during the Galwan episode, largely because the Chinese PLA, which constantly appears on our borders in overwhelming numbers, actually has only 9,75,000 officers and men. This is considerably fewer than the Indian army, which according to diverse sources, numbers between 12,50,000 and 14,00,000 officers and men.

China is an aspiring world power that spends $252 billion on its defence budget, as compared to $72.9 billion that India spends. Both countries limit their budget to around 2 per cent of their GDP, which in China's case is five times our size. They have downsized their army and built a navy, which is growing faster than the US navy. They are invulnerable on land, and their only strategic weakness is their reliance on the Indian Ocean SLOCs (sea lines of communications) for 70 per cent of their imported oil.

The only guarantee of Chinese non-aggression and good behaviour is a well-crafted threat to their oil tankers and a complete naval mastery of the escalation that is bound to follow. The first step is to accept that we are an asymmetric power and leverage the RMA (Revolution in Military Affairs) so that numerical inferiority is of no consequence. We start by dividing the Indo-Pacific, including the South China seas and the Eastern Indian Ocean, into areas of maritime search responsibility between the QUAD. All nations operate on a common reporting communication net, centred either in Port Blair or Visakhapatnam. On being requested by India, the QUAD maritime search aircraft gain information dominance over the Indo-Pacific on all PLAN (People's Liberation Army Navy) movements taking place, aimed at transiting the Malacca Straits. The Indian navy apprehends all

China-bound tankers and keeps them in a quarantine anchorage off the Nicobars, with a diplomatic declaration that India reserves the right to choose the time and place of retaliation, and alerts the QUAD.

The impounded tankers are unharmed and are merely bait for the PLAN to respond, by coming to engage the Indian navy. The movement of PLAN units is reported days in advance to the waiting Indian forces by QUAD resources. The PLAN units are funnelled through the geographically constrained straits into, what is, to borrow an army tactical expression, a killing ground. What would be greatly beneficial, and to make the operation tri-service, is to build up the Car Nicobar airfield into a full-fledged airbase and permanently station a squadron of suitable aircraft. If the air force can be coaxed into abandoning its territorial airspace defence mentality, and go expeditionary, we could negotiate with Oman for the use of the old RAF airbase at Masirah to dominate the Gulf of Hormuz and threaten the Chinese base at Djibouti.

All this makes an elegant strategic solution and a better alternative to reinforcing the unfavourable geography of the Sino-Indian border in the Himalayas. As the years pass, manpower is going to get increasingly expensive, and as it is, our strategic options are constrained because the army gets 61 per cent of the defence budget. Sadly, 81 per cent of the army budget goes into manpower and maintenance.

We can achieve better conventional deterrence against China by giving bigger roles to the navy and air force and downsizing the army by 2,00,000 men over five years through retirement and reduced recruitment. The reduction in manpower will save approximately Rs 30,000 crore, which can be equally divided between the three services. The army can replace its vintage T72 tanks or acquire three squadrons of gunships. The navy can easily acquire its cherished third aircraft carrier, and the air force its two new fully-equipped airbases abroad.

Not by throwing expensive manpower at the problem, but by giving bigger roles to the navy and air force and downsizing the army by 200,000 men.

The Chinese are about to extend their geographical advantage by building a new high-speed rail from Chengdu, running close by and parallel to the Arunachal border, up to Lhasa. China cannot be countered by throwing expensive manpower at the problem, but only by shifting the battle space to advantageous geography, by a united navy and air force effort, while a technically advanced army holds the Himalayan border.

Asian countries stockpile powerful new missiles

Josh Smith | 21 July 2021

Source: Taipei Times | https://www.taipeitimes.com/News/feat/archives/2021/07/21/2003761199

Asia is sliding into a dangerous arms race as smaller nations that once stayed on the sidelines build arsenals of advanced long-range missiles, following in the footsteps of powerhouses China and the US, analysts say.

China is mass producing its DF-26, a multipurpose weapon with a range of up to 4,000km — while the US is developing new weapons aimed at countering Beijing in the Pacific.

Other countries in the region are buying or developing their own new missiles, driven by security concerns over China and a desire to reduce their reliance on the US.

Before the decade is out, Asia will be bristling with conventional missiles that fly farther and faster, hit harder and are more sophisticated than ever before — a stark and dangerous change from recent years, analysts, diplomats and military officials say.

"The missile landscape is changing in Asia, and it's changing fast," said David Santoro, president of the Pacific Forum.

Such weapons are increasingly affordable and accurate, and as some countries acquire them, their neighbors don't want to be left behind, analysts said. Missiles provide strategic benefits such as deterring enemies and boosting leverage with allies, and can be a lucrative export.

The long-term implications are uncertain, and there is a slim chance that the new weapons could balance tensions and help maintain peace, Santoro said.

"More likely is that missile proliferation will fuel suspicions, trigger arms races, increase tensions, and ultimately cause crises and even wars," he said.

HOMEGROWN MISSILES

According to unreleased 2021 military briefing documents, US Indo-Pacific Command (INDOPACOM) plans to deploy its new long-range weapons in "highly survivable, precision-strike networks along the First Island Chain," which includes Japan, Taiwan and other Pacific islands ringing the east coasts of China and Russia.

The new weapons include the Long-range Hypersonic Weapon (LRHW), a missile that can deliver a highly maneuverable warhead at more than five times the speed of sound to targets more than 2,775km away.

An INDOPACOM spokesman said that no decisions had been made as to where to deploy these weapons. So far, most American allies in the region have been hesitant to commit to hosting them. If based

in Guam, a US territory, the LRHW would be unable to hit mainland China.

Japan, home to more than 54,000 US troops, could host some of the new missile batteries on its Okinawan islands, but the US would probably have to withdraw other forces, a source familiar with Japanese government thinking said, speaking anonymously because of the sensitivity of the issue.

Allowing in American missiles — which the US military will control — will also most likely bring an angry response from China, analysts said.

Some of America's allies are developing their own arsenals. Australia recently announced it would spend US$100 billion over 20 years developing advanced missiles.

Asia's missile proliferation will fuel suspicions, trigger arms races, increase tensions and ultimately cause crises and even wars.

"COVID and China have shown that depending on such extended global supply chains in times of crisis for key items — and in war, that includes advanced missiles — is a mistake, so it is sensible strategic thinking to have production capacity in Australia," said Michael Shoebridge of the Australian Strategic Policy Institute.

Japan has spent millions on long range air-launched weapons, and is developing a new version of a truck-mounted anti-ship missile, the Type 12, with an expected range of 1,000km.

Among US allies, South Korea fields the most robust domestic ballistic missile program, which got a boost from a recent agreement with Washington to drop bilateral limits on its capabilities. Its Hyunmoo-4 has an 800km range, giving it a reach well inside China.

"When the US allies' conventional long-range-strike capabilities grow, the chances of their employment in the event of a regional conflict also increase," Zhao Tong, a strategic security expert in Beijing, wrote in a recent report.

Despite the concerns, Washington "will continue to encourage its allies and partners to invest in defense capabilities that are compatible with coordinated operations," US Representative Mike Rogers, ranking member of the House Armed Services Committee, said.

BLURRED LINES

Taiwan has not publicly announced a ballistic missile program, but in December the US State Department approved its request to buy dozens of American short-range ballistic missiles. Officials say Taipei is mass producing weapons and developing

cruise missiles such as the Yun Feng, which could strike as far as Beijing.

All this is aimed at "making the spines of [Taiwan's] porcupine longer as the abilities of China's military improve," Wang Ting-yu (王定宇), a senior lawmaker from the ruling Democratic Progressive Party, said, while insisting that the island's missiles were not meant to strike deep in China.

One diplomatic source in Taipei said Taiwan's armed forces, traditionally focused on defending the island and warding off a Chinese invasion, are beginning to look more offensive.

"The line between defensive and offensive nature of the weapons is getting thinner and thinner," the diplomat added.

South Korea has been in a heated missile race with North Korea. The North recently tested what appeared to be an improved version of its proven KN-23 missile with a 2.5-ton warhead that analysts say is aimed at besting the 2-ton warhead on the Hyunmoo-4.

"While North Korea still appears to be the primary driver behind South Korea's missile expansion, Seoul is pursuing systems with ranges beyond what is necessary to counter North Korea," said Kelsey Davenport, director for nonproliferation policy at the Arms Control Association in Washington.

As proliferation accelerates, analysts say the most worrisome missiles are those that can carry either conventional or nuclear warheads. China, North Korea and the US all field such weapons.

"It is difficult, if not impossible, to determine if a ballistic missile is armed with a conventional or nuclear warhead until it reaches the target," Davenport said. As the number of such weapons increases, "there is an increased risk of inadvertent escalation to a nuclear strike."

Can The U.S. Provide 'Over-The-Horizon' Air Support For Afghanistan?

Paul Iddon | 24 July 2021

Source: Forbes | https://www.forbes.com/sites/pauliddon/2021/07/24/how-can-the-us-maintain-over-the-horizon-support-for-afghanistan/?sh=4a2e67b24322

The United States has said it will provide Afghanistan's military with "over-the-horizon" air support after completing its troop withdrawal from the country. How it can do so with the significant number of potential constraints that may soon emerge, however, isn't all that clear.

In mid-July, the U.S. launched several airstrikes in support of Afghan government forces fighting the Taliban. These strikes were reportedly demonstrative of the stated U.S. intention of providing air support, at least until it completes its withdrawal from the country by Aug. 31.

U.S. Defense Secretary Lloyd J. Austin said at a press conference Wednesday that after Aug. 31, U.S. airstrikes would only target Al Qaeda and other terrorist groups in the country, not the Taliban. It's unclear whether or not this policy will change if the Taliban is on the verge of capturing the capital Kabul, where the U.S. is keeping about 650 troops to provide security for its embassy there.

At the same press conference, Chairman of the Joint Chiefs of Staff Gen. Mark Milley warned that a "complete Taliban takeover" is a possibility, with the group already having seized roughly half of Afghanistan's districts, although he said he doesn't believe "the endgame is yet written."

Chairman of the Joint Chiefs of Staff Gen. Mark Milley warned that a "complete Taliban takeover" is a possibility, with the group already having seized roughly half of Afghanistan's districts, although he said he doesn't believe "the endgame is yet written."

The U.S. doesn't have permission to use any military bases in the six countries bordering Afghanistan. That means that its aircraft have to fly from bases in the Persian Gulf or from aircraft carriers.

"Distance will effectively eliminate any U.S. capability to provide close air support for Afghan forces on the ground," Rodger Baker, senior VP for strategic analysis at Stratfor, told me. "However, such air assets could still be used for targeting static sites (training camps, arms caches), or used in pre-planned offensive operations, assuming the United States is granted overflight clearance from Pakistan."

Since neighboring Pakistan isn't allowing the U.S. to base aircraft on its soil for operations over Afghanistan, Washington has entered discussions with Tajikistan and Uzbekistan. Russia, Baker said, reportedly supports the U.S. military carrying out operations from Central Asia, provided there are clear constraints on its mission.

Islamabad's refusal to allow the U.S. use of its territory as a base of operations could degrade Washington's ability to carry out intelligence, surveillance and reconnaissance (ISR) missions over Afghanistan.

"Pakistan would have served as a much better base of operations for U.S. drone flights over Afghanistan, south of the mountain range, but potential operations from Central Asia may offer similar intelligence and surveillance support," Baker said.

The ultimate location of U.S. operational sites in the region and overflight permission from regional countries will have a significant impact on U.S. decision-making on post-withdrawal airstrikes in Afghanistan.

"Without operational basing in Pakistan, the bar will likely be higher for U.S. active military intervention, even through the use of armed drones," Baker said. "Any action in support of the Afghan military forces

would likely require a specific request from the Afghan government, and likely need to match the overflight or operational agreements with neighboring countries."

"However, the United States has demonstrated its commitment to carry out unilateral operations should it perceive a direct non-state actor threat against the United States," he added.

Afghanistan has a modest air force that the U.S. helped it build up over the years. However, maintenance issues and other shortcoming could severely inhibit that air arm's ability to help fend off Taliban advances and support Afghan soldiers on the battlefield.

The Afghan air force lacks fighter jets, using Cessna AC-208 Caravans and Brazilian-made A-29 Super Tucanos light attack aircraft, and relies heavily on helicopters.

U.S. contractors provide a staggering 100 percent of the maintenance for Afghanistan's fleet of UH-60 Black Hawk helicopters and C-130 Hercules transport planes, according to the New York Times.

Afghanistan had long preferred Russian-built Mi-17 'Hip' utility helicopters since it finds them easier to fly and maintain in light of the fact that it operated such Russian hardware for decades.

The U.S. used to procure the Mi-17s for the Afghan Air Force. That all changed when Congress banned the use of federal funds for the purchase of military hardware from Russia almost a decade ago. Rather than seeking out second-hand Mi-17s from former Soviet states, several of which are even fellow NATO members, the U.S. began supplying Afghanistan with UH-60s, hoping they could replace the Afghan Mi-17s.

However, it could even take until the mid-2030s, according to a U.S. official quoted by the Times, for the Afghan air force to be able to operate their Black Hawks without assistance from contractors. With most of the contractors already having left the country, Afghanistan will undoubtedly struggle to keep its Black Hawks operational in the coming months. Remote technical support via Zoom will not likely prove an adequate substitute for on the ground contractors.

"While the Afghan Air Force has been built up and trained over the past several years, it still has a limited number of trained pilots and a significant lack of experienced maintenance personnel," Baker said.

"The shift to U.S. Blackhawks from Russian Hips poses a particular challenge for Afghan maintenance crews."

He added that there are suggestions India may seize this emerging opportunity to gain a foothold in Afghanistan by providing parts and maintenance for the Afghanistan's older Russian helicopters that remain in service.

The Indian military has long used Russian military hardware. In 2018-19, New Delhi

gifted Afghanistan four refurbished Russian-built Mi-24V 'Hind' attack helicopters it had purchased from Belarus to help Kabul improve its counterinsurgency capabilities. It might take similar steps that could help keep Afghanistan's air force in the current fight.

On the ground, as the Taliban overrun Afghan Army outposts and positions, the government agreed to arm militias across the country to help combat the group. Its decision to do so, Baker said, "is in large part a recognition of the realities of Afghanistan's continued fragmented social and political environment, and the need to reduce permissive areas for Taliban advances, particularly in the provinces around Kabul."

While arming such groups is risky, many of these militias would most likely have armed themselves if they had concluded that the Afghan government and military were too weak to stop the Taliban.

"It will be important to watch how the security environment evolves along Afghanistan's borders, particularly along the Tajik border," Baker said.

"Should the Tajik factions in Afghanistan consider the Kabul government incapable of providing security or remaining secure against the Taliban advances, they may withdraw to their traditional ethnic regions, sliding Afghanistan back toward the pattern of the late 1990s," he added.

Israel's Drone Diplomacy Tries to Offset Heavy Loses in Ice Cream War

Anshel Pfeffer | 25 July 2021

Source: Haaretz | https://www.haaretz.com/israel-news/israel-s-drone-diplomacy-tries-to-offset-heavy-loses-in-ice-cream-war-1.10020555

The tactical center of the Israel Air Force's Remotely Piloted Aircraft division at the Palmachim air base is festooned with flags. Flying alongside the Star of David are the flags of the United States, Britain, France, Germany and Italy. Inside the building are dozens of air crew from the six countries, receiving their orders for the sorties to be flown in an hour. On their different colored flight suits are stylized Velcro patches with white arrows converging over a dark silhouette of Israel's coastline.

Welcome to the two-week Operation Blue Guardian. Personnel from six air forces have assembled to learn from each other how to operate unmanned aerial vehicles. And also to let the world know they've all come to Israel to do this. The Israel Defense Forces spokesperson's unit is an integral part of it all: this isn't just a military exercise, it's a media spectacle.

This is the first international exercise of its kind featuring members of different air forces using another country's systems, flying together in dual-drone formations. One is operated by a foreign team, the

second by Israeli operators, and after each sortie the teams sit together in joint briefings.

While the Hermes 450 ("Zik") drones being used are unique to the IAF, the point of the exercise isn't to learn how to fly them – as they are directed automatically anyway by a click of a computer mouse – but to learn "how to fly missions." What's important in these missions isn't how to get the drone over the designated area, but how to use its advance sensors to locate and acquire targets and other usable intelligence.

In some of the sorties, the RPA teams coordinate with manned fighter jets and attack helicopters, which carry out simulated strikes based on the coordinates they receive during the mission. The foreign personnel are operating according to an Israeli doctrine that uses several drones working in tandem to sweep the area, identify targets and ensure there are no civilians in the kill zone.

In the evenings, they gather to share stories and battle experience of the various Middle East theaters in which their different countries have operated – Iraq, Afghanistan, Lebanon, Gaza and elsewhere.

There is of course another aspect to drone warfare. Despite repeated reports in the foreign media on the use Israel has made of armed drones in targeted killings, the simulated airstrikes in the exercise are carried out by manned aircraft, F-16 fighters and Apache helicopters.

The Hermes 450 drones taking off from Palmachim during the exercise have no pylons. In Blue Guardian, they are using their sensors.

When asked, none of the officers involved in the exercise could come up with a plausible scenario in which such cooperation between RPA teams would take place in actual operations. But there still is a concrete purpose to this exercise beyond gaining professional expertise: it's another form of diplomacy. By holding such an event openly in the media glare, Israel is demonstrating how it has become an accepted and respected partner of NATO and its main members.

Not that long ago, some of the countries taking part in Blue Guardian – especially Britain and France – would have balked at publicizing this level of military cooperation with Israel. They have extensive diplomatic and commercial interests in the Arab world and were concerned about jeopardizing them.

One of the changes that the Abraham Accords has wrought in the region is that no one thinks anymore that close ties with Israel can harm similar relations with the Arab world, certainly when it comes to the Gulf states. Yet still, bringing together teams from five Western nations on such an exercise, especially when the memory of the carnage of the Gaza conflict in May is still so fresh, is a diplomatic triumph.

This week, as major newspapers around the world, including Haaretz, carried the findings of the Pegasus Project, we learned of another form of Israeli diplomacy. The list of countries that had used the NSO Group's cyberhacking tools to keep tabs on journalists, human rights activists and political rivals tallied perfectly with the list of autocrats and populists courted over the past decade by former Prime Minister Benjamin Netanyahu.

We now have a better idea of the kind of sweeteners Netanyahu threw in to build his impressive array of international alliances and what the bland statements on "agreement to cooperate in the field of cybersecurity" actually means. It was a fascinating insight on how Israel has been conducting itself in a murky world.

At the end of a week in which Ben & Jerry's sent Israeli politicians into meltdown, a joint exercise with five Western air forces, has injected some perspective on the multiple levels of Israel's standing in the world.

At the end of a week in which the announcement by Ben & Jerry's that it would be ending the agreement with its Israeli licensee to manufacture its ice cream in Israel induced mass hysteria among Israeli politicians, the joint exercise, along with the NSO revelations, injects some perspective on the multiple levels of Israel's standing in the world.

On what side does the power reside? With activists in Vermont who successfully pressured the progressive Jewish founders of the ice cream company? With journalists and researchers who revealed the ways an advanced surveillance system has been used by authoritarian regimes? Or is it with the governments that use Pegasus to suppress dissent, the tech companies that develop those capabilities and the militaries constantly refining their remotely controlled weapons systems and doctrines for taking out targets?

Israel is losing, if it hasn't already lost, the battle for one side of that power balance. If Ben & Jerry's remains available in Israeli stores after the end of 2022, it will only be because the corporate giant Unilever somehow forces the company it owns to allow that to happen. But other companies that want to project a different type of image could pull out of Israel. And Israel's high-tech scene, for years one of the country's main selling points, is tainted by the abusive intrusion of the NSO Group and like-minded companies. On the other hand, it's not like Big Tech in other places is enjoying a particularly positive image right now.

Ironically, in some quarters – the ones where the potential customers lurk – NSO's image will have been enhanced as the preferred surveillance provider to those prepared to pay the most. Just as the negative headlines on the Gaza operation haven't deterred Western militaries from sending their

personnel to a joint exercise with the IAF. On the contrary.

It's difficult, but Israel wants to have both: the admiration of the professional hard men, the weapons and cybersecurity deals, the military cooperation. And it wants to have the free, carefree and progressive image and lifestyle that comes with tubs of Ben & Jerry's in every supermarket freezer.

Air Power

Russia Tests Hypersonic Zircon Missile

Rajeshwari Pillai Rajagopalan | 22 July 2021

Source: The Diplomat | https://thediplomat.com/2021/07/russia-tests-hypersonic-zircon-missile/

Russia has reportedly conducted a successful test launch of a hypersonic cruise missile. Russian President Vladimir Putin said earlier this week that the new hypersonic missile, Tsirkon (Zircon) was "part of a new generation of missile systems without equal in the world." The Russian defense ministry in a statement said that the missile was fired from the Admiral Gorshkov frigate in the White Sea and hit a ground target located on the coast of the Barents Sea, more than 350 kilometers away, with the missile travelling at seven times the speed of sound.

The ministry said that "the tactical and technical characteristics of the Tsirkon missile were confirmed during the tests." Russia plans to equip its submarines and surface ships with these missiles in the coming years. Even as there are questions about hypersonic missile technology, experts acknowledge that "the combination of speed, maneuverability, and altitude of hypersonic missiles makes them difficult to track and intercept."

According to one report, given the speed at which they travel, "the air pressure in front of the weapon forms a plasma cloud as it moves, absorbing radio waves and making it practically invisible to active radar systems." In addition, the reaction time of even the advanced Aegis-class system is too slow to be able to intercept such missiles. Experts estimate that "it would take fewer than a half-dozen of those missiles to sink even the most advanced American aircraft carrier, such as the USS Gerald R. Ford."

In 2018, Putin announced that Russia was developing a series of hypersonic weapons including the Avangard that "could hit almost any point in the world and evade a U.S.-built missile shield." In 2019, he threatened to use hypersonic missiles to target the U.S. directly if Washington deployed intermediate-range missiles in Europe, after the Trump administration withdrew from the Intermediate-Range Nuclear Forces (INF) Treaty. Although the U.S. has not yet deployed such missiles in Europe, Russia continues to worry about

possible deployments in the future. The U.S. claims that it withdrew from the INF treaty because of Russian cheating.

Putin has boasted of developing many weapon systems, including the Sarmat intercontinental ballistic missiles and Burevestnik cruise missile, that could evade U.S. missile defense systems. The Zircon missile itself has been tested many times and in October 2020, commenting on one of those tests, Putin claimed that it is a "great event not just in the life of our armed forces but for all of Russia."

Some of Russia's hypersonic missiles are already claimed to be deployed with its armed forces. According to Russian media reports, the government has "deployed two interceptor jets capable of carrying the hyped Kinzhal hypersonic missile for war games in Syria." Russia's defense ministry is quoted in the same report as saying that "a pair of MiG-31K aircraft with the ability to use the latest hypersonic missiles from the Kinzhal complex flew from Russian airfields to the Russian airbase Khmeimim in Syria for exercises."

Growing geopolitical rivalries will continue to drive the development of hypersonic and other lethal weapons systems.

Russia is not alone in these efforts. China has been making consistent efforts at developing hypersonic weapons. In 2019, at the military parade on the occasion of the 70th anniversary of the founding of the People's Republic of China, China showcased the DF-17 missile for the first time. Even though the U.S. has known about the DF-17 prototype for close to a decade, Mike Griffin, the U.S. undersecretary for research and engineering at the Department of Defense, in 2018 revealed that China had done "20 times as many hypersonic weapons tests as has the United States over the last decade." Like Russia, China's pursuit of hypersonic missiles appears to have been spurred by U.S. missile defense developments, which could potentially neutralize the traditional ballistic missiles that Russia and China possess.

Reacting to Russia's latest test, NATO in a statement said that it "create[s] a greater risk of escalation and miscalculation." It added that "Russia's new hypersonic missiles are highly destabilizing and pose significant risks to security and stability across the Euro-Atlantic area." The statement also said that the NATO allies remain "committed to respond in measured way to Russia's growing array of conventional and nuclear-capable missiles," but clarified that it will not undertake efforts to "mirror what Russia does, but we will maintain credible deterrence and defense, to protect our nations."

Growing geopolitical rivalries will continue to drive the development of hypersonic and other lethal weapon systems. With the U.S., Russia, and China all pursuing these technologies, it has already given way to a spiraling arms race. Countries like India and Australia have had to respond as well, albeit at different levels.

Israel Hosts First International Drone Exercise

Joe Saballa | 23 July 2021

Source: Defence Post | https://www.thedefensepost.com/2021/07/23/israel-international-drone-exercise/

The Israeli Air Force (IAF) has conducted its first international unmanned aerial vehicle (UAV) exercise with military pilots from five other countries.

Dubbed "Blue Guardian," the drill kicked off on July 13 and culminated on Thursday.

The international drone exercise was conducted following the May conflict between Israel and Palestinian militants in the Gaza Strip.

Pilots from Israel, Germany, Italy, France, the US, and the UK showcased the capabilities of Hermes-450 drones with 20 representatives from other nations in attendance.

Participating teams simulated scenarios such as ground troop support, reconnaissance, and intelligence collections missions, and cooperation with various forces in the air.

"This is the first time that we are meeting with drone operators from around the world, conducting missions together, complicated missions of assisting ground troops, of locating and striking enemies, of joint operations with manned and remotely controlled aircraft," IAF Commander Brig. Gen. Yoav Amiram told The Times of Israel.

Strategic Importance

Israel sent a total of nine teams to participate in the drill. Among the teams were operators from the 161st Black Snake Squadron, the 200th Squadron, and the 210 White Eagle Squadron.

For IAF Chief Amikam Norkin, the exercise offers a platform for mutual study and growth, playing an important role in establishing the air force internationally.

The Israel Defense Forces (IDF) commended the service for hosting an international event focusing on UAVs. It said the activity was strategically important because the country was able to team up with foreign drone operators.

The international drone exercise was conducted following the May conflict between Israel and Palestinian militants in the Gaza Strip. Amiram said the country

relied extensively on the air force's drone expertise during the conflict.

"The UAV array conducted over 6,000 flight hours during Operation Guardian of the Walls, maintained operational continuity with many aircraft over the Strip, and basically allowed aerial forces of the air force and the entire IDF to operate in a complicated, populated battlefield in which we need to find the enemy and minimize collateral damage," Amiram remarked.

Independence Day terror alert! Terrorists may use drones to strike important installations in Delhi

Abhay Parashar | 20 July 2021

Source: India TV | https://www.indiatvnews.com/news/india/delhi-independence-day-terror-alert-pakistan-terror-groups-may-use-drone-august-5-latest-updates-720660

Security agencies have sounded an alert over a possible terror attack in New Delhi using drones before Independence Day (August 15). According to sources, the Intelligence Bureau (IB) has alerted the Delhi Police regarding 'drone jihad' by Pakistan-based terror groups.

As per the alert, terror groups may use explosive-laden drones to carry out attacks in Delhi before August 15 to disrupt Independence Day celebrations.

As per the alert, terror groups may use explosive-laden drones to carry out attacks in Delhi before August 15 to disrupt Independence Day celebrations. Intelligence agencies have warned that terror groups may strike on August 5 - the day Article 370 was scrapped from Jammu and Kashmir.

Delhi Police and other security agencies are also being given special training to tackle the drone threat.

In view of the drone attack on the Indian Air Force (IAF) station in Jammu recently, Delhi Police Commissioner Balaji Srivastava had asked officials to be on alert. He had also issued orders, prohibiting the flying of aerial objects like drones, paragliders, and hot air balloons, ahead of Independence Day celebrations.

According to Delhi Police, it has been reported that certain criminals, anti-social elements or terrorists inimical to India may pose a threat to the safety of the general public, dignitaries and vital installations by using sub-conventional aerial platforms like paragliders, Unmanned Aerial Vehicles (UAVs) or drones, remotely piloted aircraft, hot air balloons, quadcopters or para-jumping from aircraft etc.

On June 27, two consecutive explosions took place at the high security Jammu Air Force station. A drone, in a first-of-its kind

strike, dropped two bombs at IAF station at Jammu, causing minor injuries to two personnel.

The U.S. Air Force Is Sending Dozens Of F-22 Stealth Fighters To Practice For War With China

David Axe | 20 July 2021

Source: Forbes | https://www.forbes.com/sites/davidaxe/2021/07/20/the-us-air-force-is-sending-dozens-of-f-22-stealth-fighters-to-practice-for-war-with-china/?sh=10bfd2d6faf9

The U.S. Air Force is deploying a huge force of fighters—including a possibly unprecedented number of F-22s—to Guam to practice for war with China.

The 10 F-15Es from the 389th Fighter Squadron at Mountain Home Air Force Base, Idaho already are on the ground at Andersen Air Force Base in Guam.

Twenty-five F-22s from two squadrons—the 525th Fighter Squadron at Joint Base Elmendorf-Richardson, Alaska, and the 199th Fighter Squadron, part of the Hawaii Air National Guard at Joint Base Pearl Harbor-Hickam—should arrive soon.

Two C-130J transports from the 374th Airlift Wing at Yokota Air Base, Japan are accompanying the fighters. The C-130s and other support planes are critical to what happens next.

Under the rubric of Exercise Pacific Iron 21, the fighters will spread out across four airfields. Three—Andersen, A.B. Won Pat International Airport and Northwest Field—are in Guam. One, Tinian International Airport, lies 120 miles north of Guam.

The plan, according to Air Force releases, is for the fighters to practice deploying to, and flying sorties from, austere airfields. The flying branch in recent years has grown increasingly worried that, in the early hours of a regional war, the Chinese People's Liberation Army Rocket Force might fire scores of ballistic missiles at big U.S. bases, including Andersen.

Under the new "agile combat employment" concept, the Air Force would scatter its planes across dozens of small airstrips in the Western Pacific, all in the hope of complicating China's bombardment.

Under the new "agile combat employment" concept, the Air Force would scatter its planes across dozens of small airstrips in the Western Pacific, all in the hope of complicating China's bombardment. Some of the airstrips, such as Northwest Field in Guam, are leftover from World War II.

"ACE is the use of agile operations to generate resilient air power in a contested environment and is designed to organize, train and equip airmen to be more agile in operation execution, strategic in deterrence

and more resilient in capabilities," the Air Force stated.

The Air Force for years has been practicing this dispersal concept, but rarely with so many fighters—to say nothing of so many stealth fighters.

The F-22, like all low-observable warplanes, requires extensive maintenance between sorties. That can be hard to do at an airstrip without permanent facilities.

The presence of the C-130s in the force mix for Pacific Iron 21 is telling. It's one thing to land a bunch of F-22s on some disused runway and throw up some tents for the crews and maintainers. It's quite another to keep the planes and airmen supplied with food, fuel, parts and ammunition.

To keep the austere bases combat-ready in wartime, the Air Force would need to sustain a steady rhythm of resupply missions.

Moreover, many of the potential outlying bases the Air Force has identified for potential use during a crisis lie hundreds of miles from likely combat zones over the Philippine Sea and China Seas.

The fighters would need support from aerial tankers—lots of it. "Air refueling is critical to agile combat employment because it extends the aircraft's range and duration of flight," U.S. Transportation Command tweeted last month.

Those tankers are too big safely to operate from austere airstrips. While the Air Force might succeed in spreading out its fighters in order to protect them from Chinese rockets, the service could struggle to do the same for its tankers and transport planes.

Likewise, America's heavy bombers depend on big air bases. At least three B-52s from the 5th Bomb Wing at Minot Air Force Base in North Dakota arrived at Andersen last week. KC-135 tankers usually accompany these Guam bomber rotations.

The logistical demands of "distributed" air operations represent a major challenge. All those F-15s and F-22s dispersing around Guam should be impressive.

But it'd be even more impressive to see the Air Force support those scattered fighters in a way that the Chinese can't shut down with a few rockets.

Russia unveils new fighter, Putin hails country's air power

Associated Press | 20 July 2021

Source: Money Control | https://www.moneycontrol.com/news/world/russia-unveils-new-fighter-putin-hails-countrys-air-power-7198831.html

Russian aircraft makers on Tuesday unveiled a prototype of a new fighter jet that features stealth capabilities and other advanced characteristics.

Russian President Vladimir Putin inspected the prospective warplane displayed with much fanfare at the MAKS-2021 International Aviation and Space Salon. The air show opened Tuesday in Zhukovsky, outside Moscow.

Russian aircraft maker Sukhoi developed the new fighter under the LTS program, a Russian acronym for the Light Tactical Aircraft.

Its makers said the prototype is set to make its maiden flight in 2023 and deliveries could start in 2026. They said the new design could be converted to an unpiloted version and a two-seat model.

The new aircraft, which hasn't received a name yet, is smaller than Russia's latest Su-57 two-engine stealth fighter, also built by Sukhoi, and has one engine. It can fly at a speed of 1.8-2 times the speed of sound and has a range of 3,000 kilometers (1,864 miles), the jet's makers said.

Russian state corporation Rostec, which includes Sukhoi and other aircraft makers, has advertised the new plane under the tag Checkmate, an approach apparently intended to underline its superior characteristics.

It said the new warplane belongs to the so-called fifth generation of fighter jets, a definition that assumes stealth characteristics and a capability to cruise at supersonic speed, among other advanced features.

Rostec said the new design includes artificial intelligence features to assist the pilot and other innovative technologies. It said the jet was designed to reduce service costs and to be easily adapted to varying customer needs.

The prospective Russian fighter jet appears intended to compete with the U.S. F-35 Lightning II fighter, which entered service in 2015.

Rostec said the new design includes artificial intelligence features to assist the pilot and other innovative technologies.

Rostec ran an aggressive advertising campaign in the days before the air show, publishing a picture of the new fighter hidden under a black tarpaulin with "Wanna see me naked?" written under it. It also posted a video featuring adulatory customers from India, the United Arab Emirates, Argentina, Vietnam and other countries, reflecting export hopes.

Plane spotters flocked to Zhukovsky last week to take pictures of the new plane as it was being taxied to a parking spot across the giant airfield which has served as the country's top military aircraft test facility since Cold War times.

The Kremlin has made modernization of the country's arsenals a key priority amid tensions with the West that followed Moscow's 2014 annexation of Ukraine's Crimean Peninsula.

It also has strongly encouraged the development of new passenger jets to compete with planes built by American aircraft maker Boeing and Europe's Airbus that currently account for the bulk of Russian carriers' fleets.

Russia's airliner programs have encountered delays amid Western sanctions that hampered imports of Western engines and other key components. But the country managed to produce a new engine for the new MS-21 passenger plane, which also was displayed at the show in Zhukovsky.

"What we saw in Zhukovsky today demonstrates that the Russian aviation has a big potential for development and our aircraft making industries continue to create new competitive aircraft designs," Putin said in a speech at the show's opening.

PLA increases use of simulators in pilot training, high efficiency reported

Liu Xuanzun | 20 July 2021

Source: Global Times | https://www.globaltimes.cn/page/202107/1229076.shtml

The Chinese People's Liberation Army (PLA) Air Force is increasing the use of simulators in pilot training, an approach that can significantly reduce cost, increase pilot's training time and practice special scenarios that are hard to replicate with real aircrafts, a recent report said.

It also shows that China has established a technically advanced simulation training system, experts said on Monday.

An aviation brigade affiliated with the Air Force of the PLA Central Theater Command started to use simulators to train pilots in 2019. By 2020 it had established a training simulation center and proved that it is feasible to reduce training with real aircrafts thanks to training simulations this year, No. 34 Military Room, a WeChat public account affiliated with the PLA Daily, reported on Sunday.

According to the report, Yang Peng, training staff officer of the brigade, noted that compared with the cost of aviation fuel, maintenance of the aircraft and consumption of spare parts, the cost of training simulators is much lower.

Due to the high costs, pilots get fewer chances to practice with real aircrafts. However, simulators will provide more opportunities for them to master flying techniques, the report said, noting that simulators can also replicate many scenarios that cannot be easily tried with real aircrafts, including emergencies.

Starting this year, pilots will be using a type of simulator integrated with artificial intelligence that assists training, learns from each engagement and can become a top ace, even superior to human pilots, the report said.

China used to lack the technologies to develop advanced, realistic training simulators to conduct meaningful training but now it has a complete system to develop and maintain this kind of simulators that have become key in the PLA's routine training, Fu Qianshao, a Chinese military aviation expert, told the Global Times.

An aviation brigade affiliated with the Air Force of the PLA Central Theater Command started to use simulators to train pilots in 2019.

Simulators help pilots improve their flight skills and contribute to flight safety, and train the pilots' situational awareness and help develop new tactics, Fu said, noting that the simulators could become interconnected with pilots using different simulators and fighting each other in simulated combat scenarios.

The PLA Air Force is not the only PLA service that uses training simulators.

For instance, a logistics support unit affiliated with the PLA Northern Theater Command Navy used virtual reality (VR) simulators to practice the disassembly of equipment, location of malfunctions and fixing of pipelines in a wartime fuel support drill, the PLA Daily reported in March.

A brigade attached to the 83rd Group Army of the PLA has set up more than 10 VR training simulation rooms for instruction in multiple areas, including individual combat skills and coordinated action and command, China Central Television reported earlier this year.

The Rocket Force is also using similar simulation technologies to practice the launch of missiles, like during a launch exercise conducted in mid-March reported by the PLA Daily in March.

The deployment of training simulations is a reflection of the PLA's development of a new military training system and the strengthening of the military by science and technology, analysts said.

China-made drones hover over India, call for regulation

GC News Desk | 16 July 2021

Source: Goa Chronicle | https://goachronicle.com/china-made-drones-hover-over-india-call-for-regulation/

India is seeing a deluge of China-made drones, many of them are said to be sighted near the country’s military installations and highly protected areas.

There are nearly five lakhs mostly illegal Chinese-made drones in different sizes and weights, experts say, that pose serious security threats to the country.

The drone market in India is inundated with Chinese-made Unmanned Aerial Vehicles (UAVs) and they are not regularised as per the standards, Sai Pattabiram CEO & founder of Chennai-based Sree Sai Aerotech Innovations Pvt. Ltd. (SSAI) said while talking to UNI.

"To counter these illegal drones, we have to create an indigenous drone ecosystem with proper measures in the country," Pattabiram says.

The UAVs that can be manoeuvred remotely by a pilot are becoming the signature weapon of terrorists across the globe. The country saw this in the June 27 twin drone attack at the Air Force Station in Jammu.

The drone market in India is inundated with Chinese-made Unmanned Aerial Vehicles (UAVs) and they are not regularised as per the standards

Among those drones that are used by the military, Iran, Turkey, and China have serious arsenals, there are emerging drone alliances around the world.

Reports say that an improvised low-cost rotary-wing drone was used to drop explosives at the IAF Jammu.

According to the Central agencies, over 300 drones and unidentified flying objects have been sighted along the sensitive border with Pakistan after the 2019 abrogation of Article 370.

Drones have very little infra-red or radar signature to be picked up by the traditional air defence systems and it's hard to track them at night or in foggy weather because of their small size and low engine noise.

The present technology is not fully equipped to neutralise UAVs.

Their Radio Frequency (RF) is similar to our wifi routers. Even if we use RF jamming to inactive drones, it can affect the Internet as well, Pattabiram says.

Apart from the aggressive tracking, he also suggests monitoring within the country.

According to a study by the Directorate General of Civil Aviation (DGCA), the drone market is estimated to touch 886 million dollars by 2021 in India.

Based on their weight, UAVs can be classified into five categories–nano (weighing up to 250 g), Micro air vehicles (MAV) (250g – 2kg), Miniature UAV or small (SUAV) (2-25 kg), medium (25-150 kg), and large (over 150 kg).

They need to require a licensed pilot and permit from the Director General of Civil

Aviation (DGCA). However, nano drones need not require a permit.

As per the Unmanned Aircraft System Rules, 2021, issued by the Ministry of Civil Aviation, the ability to fly a drone in the country is subject to the type of drone and the corresponding permit and license needed for it.

These rules have several restrictions on drone use apart from licences and permits to use drones.

The Ministry is reported to be in the process of preparing new rules to regulate drone use in India.

China's Air Incursions Into Taiwan's ADIZ Focus on 'Anti-Access' and Maritime Deterrence

Olli Pekka Suorsa and Adrian Ang U-Jin | 20 July 2021

Source: The Diplomat | https://thediplomat.com/2021/07/chinas-air-incursions-into-taiwans-adiz-focus-on-anti-access-and-maritime-deterrence/

Chinese aerial incursions into Taiwan's Air Defense Identification Zone (ADIZ) have received a lot of attention since the island's Ministry of National Defense (MND) began making the data public in September 2020. Understandably, the larger scale incidents, like that of June 15 – the largest thus far, involving 28 aircraft – have generated heated debates about the rationale for the incursions. Recently, in these pages, a former Republic of China Navy captain, Lu Li-Shih, joined this chorus "decoding China's recent combat drills in the first island chain."

However, Lu added to the confusion surrounding the issue by directing attention to the KJ-500 airborne early-warning and control (AEW&C) aircraft, claiming the type's presence as the "most intriguing" fact. Instead, we argue that the prominent presence of other special mission aircraft, especially the KQ-200 maritime patrol and anti-submarine warfare (MP-ASW) aircraft deserves more attention in helping us uncover the underlying rationale of Chinese actions in the Southwestern part of Taiwan's ADIZ.

Betting on the Wrong "Horse"

The presence of KJ-500 AEW&C aircraft in Taiwan's southwestern ADIZ is neither unusual nor unexpected. The aircraft have increasingly become part of the People's Liberation Army Air Force (PLAAF) and People's Liberation Army Naval Air Force (PLAN-AF) order of battle since the mid-2010s, addressing a major capability gap. The IISS Military Balance 2021 recorded a total of 25-plus KJ-500 AEW&C aircraft currently in service between the PLAAF and PLAN-AF. Both services operate the type in the Eastern and Southern Theater Commands, facing Taiwan. In comparison, only two years ago the IISS Military Balance 2019 reported fewer than half that

number – 11 KJ-500s – in operation between the two services.

The KJ-500 has become an important element in all major PLAAF air exercises, in accordance with Xi Jinping's insistence on "more realistic combat training" for the service. Thus, the increased presence of KJ-500s sighted within Japan and Taiwan's ADIZs, as well as in the South China Sea, should be expected as it is indicative of a natural development in the PLAAF and PLAN-AF's drive to become modern, "informatized" and "networked" forces. Therefore, we should expect to see KJ-500s become an increasingly normal sight and a critical element of any Chinese air operations or exercises within Taiwan's ADIZ, coordinating friendly forces' actions and providing early warning of any fighter aircraft scrambled to intercept Chinese formations.

The KQ-200 is also commonly sighted patrolling within Japan's ADIZ, demonstrating Beijing's interest in surveilling foreign naval activity – both surface and sub-surface – around the two most important maritime choke points in the so-called first island chain

KQ-200 MP-ASW and China's "Anti-Access" Strategy

In addition to the KJ-500 AEW&C, China's military modernization has focused strongly on filling capability gaps and addressing weaknesses. One well-known capability gap has been the Chinese navy's lack of capable maritime patrol and anti-submarine warfare (MP-ASW) aircraft. The PLAN-AF's answer to this deficiency is built around the KQ-200 MP-ASW aircraft, which is widely deployed currently with both the Eastern and Southern Theater Commands. Importantly, our research indicates that the KQ-200 MP-ASW aircraft has been the most frequent intruder into the southwestern part of Taiwan's ADIZ. Out of 192 incursions recorded between September 16, 2020 and July 15, 2021, 131 (68.2 percent) have involved at least one KQ-200 while 12 incursions (6.3 percent) have involved two KQ-200s. Over this period, KQ-200s have flown 143 sorties. Significantly, the KQ-200 MP-ASW has been involved in all 10 large-scale incursions (involving 10 or more sorties) recorded by Taiwan's MND. In comparison, the KJ-500 AEW&C was involved in only seven of the 10 large-scale incursions and has flown only 19 sorties during the same time period.

For context, the KQ-200 is also commonly sighted patrolling within Japan's ADIZ, demonstrating Beijing's interest in surveilling foreign naval activity – both surface and sub-surface – around the two most important maritime choke points in the so-called first island chain: the Bashi Channel and the Miyako Strait.

We argue that the KQ-200 MP-ASW aircraft's prominent presence in all large-scale formations intruding into the southwestern portion of Taiwan's ADIZ on, for example, March 26 and April 12 of this

year, likely demonstrated China's interest to control the first island chain, and its intent to deny foreign navies, in particular that of the U.S., access in any Taiwan Strait conflict scenario.

Moreover, as we argued in our earlier piece for The Diplomat, these missions were likely linked to the simultaneous presence of a U.S. aircraft carrier strike group (CSG) in the vicinity. This can be demonstrated in China's large aircraft formations entering Taiwan's ADIZ on January 24, March 29, and June 15. The MND's data also shows that the KQ-200s typically loiter farther out at sea than any other aircraft type. Thus, we argue that both the crude flight route data provided by the MND, the known presence of a U.S. CSG, and the composition of each large-scale formation, involving at least one KQ-200 as well as one or more anti-ship missile capable combat aircraft types (i.e., H-6K, JH-7A, and J-16) point to a strong "anti-access" and maritime deterrence focus.

China's intentions are likely directed against outside interference — and not at Taiwan specifically.

Unlike the Chinese high-visibility "circumnavigation" flights around Taiwan in 2016, 2017, and 2020, which were considered attempts at intimidating and warning the Taiwanese people against electing the Democratic Progressive Party candidate, Tsai Ing-wen, as president, the more recent long-distance missions undertaken by China have only reached as far as past the Bashi Channel and the Western Pacific Ocean. Therefore, we argue that the recent large-scale incursions into Taiwan's ADIZ are very different in meaning and rationale to the earlier "circumnavigation" flights.

In addition to data provided by Taiwan's MND, our argument can be further corroborated with reports citing Japan Air Self-Defense Force (JASDF) sources from 2019, suggesting that Chinese KQ-200 and H-6K aircraft flew through the Miyako Strait and established communications with PLAN vessels already in the Western Pacific in a joint exercise between PLA's surface and air components. More recently, in April 2021, China's Global Times reported about a joint air and sea exercise, involving the Liaoning carrier, Type 055 and Type 052D destroyers, and Type 054A frigates, as well as KQ-200 aircraft, among others. The exercise was reportedly a response to U.S. naval "provocations."

Such exercises and the PLAN's presence outside the first island chain, in the Western Pacific, have become increasingly common with the modernization and growing "jointness" and confidence of the PLA. However, by using only the data provided by the MND, we can merely observe a

single element of possibly much larger exercises. Due to the lack of similar consistent data from, for example, Japan, we are not able to establish whether the equally, if not more, frequent Chinese incursions into Japan's ADIZ in the East China Sea and near the Miyako Strait are linked to the incursions observed in the southwestern part of Taiwan's ADIZ.

Nevertheless, what we can observe is the prominent role of new and increasingly capable special mission aircraft, and, especially, the KQ-200 MP-ASW in China's maturing "anti-access" and maritime deterrence construct.

Three more Rafale fighter jets arrive in India from France

PTI | 22 July 2021

Source: The Print | https://theprint.in/defence/three-more-rafale-fighter-jets-arrive-in-india-from-france/700511/

The seventh batch of three more Rafale fighter jets arrived in India after flying non-stop for a distance of almost 8,000 km from France, in a further boost to the strike capability of the Indian Air Force (IAF).

The new batch of the aircraft will be part of the IAF's second squadron of the Rafale jets.

The aircraft were provided mid-air refuelling by the air force of the United Arab Emirates (UAE).

"Three Rafale aircraft arrived in India a short while ago, after a direct ferry from #IstresAirBase, France. IAF deeply appreciates the support by UAE Air Force for in-flight refuelling during the non-stop ferry," the IAF said in a tweet.

Following the arrival of the new batch, the number of Rafale jets with the IAF went up to 24.

The new squadron of Rafale jets will be based in Hasimara airbase in West Bengal.

The first Rafale squadron is based in the Ambala air force station. A squadron comprises around 18 aircraft.

India had signed an inter-governmental agreement with France in September 2016 for the procurement of 36 Rafale fighter jets at a cost of around Rs 58,000 crore.

The first batch of five Rafale jets arrived in India on July 29 last year.

India is expected to get more Rafale jets from France in the next few months.

The Rafale jets, manufactured by French aerospace major Dassault Aviation, are India's first major acquisition of fighter planes in 23 years after the Sukhoi jets were imported from Russia.

The Rafale jets are capable of carrying a range of potent weapons. European missile maker MBDA's Meteor beyond visual range air-to-air missile, Scalp cruise missile and MICA weapons system will be the mainstay of the weapons package of the Rafale jets.

Israel launches air strikes on Lebanon and Syria as part of U.S.-backed shadow war

Steve Sweeney | July 2021

Source: People's World | https://www.peoplesworld.org/article/israel-launches-air-strikes-on-lebanon-and-syria-as-part-of-us-backed-shadow-war/

Israel launched a missile attack on southern Lebanon early today, just hours after air strikes had targeted Iranian forces near the Syrian city of Aleppo.

The Israeli army claimed that it was responding to four rockets launched from Lebanon that triggered warning sirens in the Western Galilee region.

No details were given of the targets of the Israeli missiles, but there have been weeks of speculation that Israel was considering a military intervention in Lebanon to diminish the influence of Hezbollah.

Syrian air defenses intercepted an Israeli missile attack on Monday night that Tel Aviv said was targeting Iranian forces in Aleppo as part of what has been described as a U.S.-backed shadow war.

"The Israeli enemy carried out an aerial attack towards south-east Aleppo, targeting positions in the al-Safirah area," a Syrian military source said. "Our air defenses intercepted the missiles … shooting down most of them." The extent of damage was still being assessed.

The attacks were believed to have targeted troops from Iran's elite Quds Force, which has a presence in Syria, playing a leading role in the fight against Isis and other jihadist groups.

It has been targeted by Israeli air strikes, along with fighters from Lebanon's Hezbollah, thousands of whom have been killed during the battle to regain control of Syria from "terrorist organizations" they say are backed by the United States.

Syrian air defenses intercepted an Israeli missile attack on Monday night that Tel Aviv said was targeting Iranian forces in Aleppo as part of what has been described as a U.S.-backed shadow war.

The Israeli Defence Force refused to comment on the air strikes, the first since a new Israeli government, led by Prime Minister Naftali Bennett, took office last month.

The far-right nationalist has vowed to continue the policy of his predecessor Benjamin Netanyahu, who launched frequent missile attacks on Syria aimed at stifling Iranian influence in the region.

Israeli air strikes killed at least 11 Syrian soldiers last month, and U.S. President Joe Biden ordered drone attacks that targeted Iranian-backed militia in both Syria and Iraq.

The groups vowed revenge for the U.S. attacks, in which a child and four soldiers were killed, and have launched a number of strikes targeting the occupying force's military bases inside Syria.

On Saturday, Syrian President Bashar al-Assad vowed to drive out U.S. and Turkish occupying forces from the country.

Ankara has troops holed up in the northern Idlib province, where they are helping various jihadist groups maintain their last stronghold.

Armenian forces foil Azerbaijani drone attempt to cross air border: Defense Ministry

UNI/Sputnik | 24 July 2021

Source: United News of India | http://www.uniindia.com/armenian-forces-foil-azerbaijani-drone-attempt-to-cross-air-border-defense-ministry/world/news/2457623.html

The Armenian Defense Ministry stated on Saturday that the national counter-air defense forces prevented the unmanned aerial vehicle from Azerbaijan from entering the republic's airspace.

"On July 23, at about 11 p.m. [19:00 GMT], the air defense subdivisions of the RA Armed Forces with corresponding actions stopped the attempt to enter the airspace of the Republic of Armenia by UAV in the south-western direction of the Armenian-Azerbaijani border," the statement read.

The situation on the mutual border is deemed as stable as of 9 a.m. on Saturday.

Space Power

Germany establishes new military space command

Vivienne Machi | 13 July 2021

Source: Defence News | https://www.defensenews.com/space/2021/07/13/germany-establishes-new-military-space-command/

The German military has announced the creation of a separate command dedicated to space, becoming the latest of a handful of

nations prioritizing more resources and missions among the stars.

The Ministry of Defence introduced the new space command in a July 13 ceremony at the German Space Situational Awareness Centre in Uedem, located in the country's North Rhine-Westphalia region.

Defence Minister Annegret Kramp-Karrenbauer provided a keynote speech for the event.

The military is "responding to the increasing significance of space for our state's ability to function, the prosperity of our population, and the increasing dependency of the armed forces on space-supported data, services and products," the ministry said in a statement.

The military is responding to the increasing significance of space for our state's ability to function, the prosperity of our population, and the increasing dependency of the armed forces on space-supported data, services and products.

Since 2009, the German Air Force, or Luftwaffe, has used the center to monitor space assets, order maneuvering of systems and recommend evasion routes to commercial satellite operators, according to the German Aerospace Center. In fall 2020, the Air and Space Operations Center, or ASOC, was inaugurated there in response to NATO's declaration of space as a new operational domain at the alliance's 2019 meeting in London, England.

As with NATO, the emphasis for ASOC was more on space as a defensive domain, with the aim of protecting German systems and further investing in space situational awareness, according to the German Institute for International and Security Affairs.

Berlin is not alone in its efforts to create a separate military space entity. The U.S. Space Force was established in late 2019 as a separate military branch under the Department of the Air Force, and now boasts a separate budget line from the Air Force and its own representation on the Joint Chiefs of Staff, with Chief of Space Operations Gen. Jay Raymond. While initial Space Force personnel were transferred in from space-related units within the Air Force, the nascent service will soon welcome its first — and soon to be former — Marines, soldiers and sailors.

The U.S. officially reestablished its Space Command on Aug. 29, 2019, which is technically the second iteration of an American space command. Established in 1985, the first Space Command was ultimately merged into U.S. Strategic Command in 2002 as part of the military reorganization following the Sept. 11 attacks.

In fall 2020, France renamed its Air Force to become the Air and Space Force, after creating its new space command Commandement de l'espace in 2019. The United Kingdom also established a separate space command in spring 2021 as a joint command staffed with personnel from the British Army, the Royal Navy, the Royal Air Force and the civil service.

NATO has named space as one of its top seven priorities for emerging and disruptive technologies, or EDT. The member nations' defense ministers endorsed a new strategy in March to ensure the alliance fosters these technologies through increased cooperation with innovation hubs and nontraditional industry, and to protect EDT investment from export issues and outside influence.

Land Acquisition for ISRO's Second Spaceport Reaches Final Stage

Col SC Tyagi (Retd.) | 13 July 2021

Source: The Wire Science | https://science.thewire.in/spaceflight/land-acquisition-for-isros-second-spaceport-reaches-final-stage/

Thoothukudi MP Kanimozhi said that the land acquisition process for the Indian Space Research Organisation (ISRO)'s rocket launch facility at Kulasekarapattinam in the district has reached the final stage and that the Tamil Nadu government will push for subsequent work to begin at the earliest.

According to The Hindu, Kanimozhi said work on acquiring land for ISRO's space vehicle launch facility was going on as the Dravida Munnetra Kazhagam (DMK) government was "keen on establishing a rocket launch pad at Kulasekarapattinam". The land acquisition process had reached an advanced stage and the government will soon hand over the land to ISRO.

"I will meet the officials concerned during my visit to New Delhi to press the demand for the early commencement of work on this facility," she said.

In September 2020, minister of state Jitendra Singh had said that the Tamil Nadu government has identified around 2,300 acres for the port, which will have one launchpad. ISRO's existing spaceport at the Satish Dhawan Space Centre in Sriharikota has two functioning launchpads.

ISRO zeroed in on Kulasekarapattinam for its second spaceport in December 2019. As The Wire Science had reported then, it would allow ISRO to launch smaller satellites more frequently using the Small Satellite Launch Vehicle (SSLV), which is

ISRO zeroed in on Kulasekarapattinam for its second spaceport in December 2019.

under development.

The Wire Science had also reported that the second port will provide strategic advantages such as allowing vehicles to enter polar orbits straightaway, without having to swerve to avoid flying over Sri Lanka, as is necessary for vehicles taking off from Sriharikota. This manoeuvre requires more fuel, therefore forcing smaller launch vehicles to reduce their payload.

ISRO chairman K. Sivan confirmed in June last year that Kulasekarapattinam's geographic location has a strategic advantage, allowing the SSLV to fly straight to the south pole.

"The payload loss in big vehicles is manageable. When it comes to small satellite launch vehicles, such manoeuvres won't give any payload capability. We selected Kulasekarapattinam because it gives us the benefit of launching straight in the southward direction," Sivan said, according to the Times of India.

ISRO to launch GISAT-1 on August 12

NewsDesk | 13 July 2021

Source: Geospatial World | https://www.geospatialworld.net/news/earth-observation-isro-plans-to-launch-geo-imaging-satellite-on-august-12/

The Indian Space Research Organization (ISRO) is picking up pace and getting back into launch activity at Sriharikota Spaceport. The organization will go ahead with its planned orbiting of geo-imaging satellite GISAT-1 on board GSLV-F10 rocket on August 12.

It is going to be the second launch of the Bengaluru-headquartered Space agency in the COVID-19-hit 2021.

On February 28, ISRO successfully launched PSLV-C51 mission with Brazil's earth observation satellite Amazonia-1 and 18 co-passengers, including some built by students, on board.

The 2,268-kg GISAT-1 was to be launched from Sriharikota in Andhra Pradesh's Nellore district on March 5, 2020, but was postponed a day before the blast-off due to technical reasons.

Thereafter, the launch was delayed due to lockdown which affected normal work.

It was scheduled for March 28 this year but a 'minor issue' with the satellite forced further postponement.

We have tentatively planned the GSLV-F10 launch on August 12, at 5.43 am, subject to weather conditions, an ISRO official was quoted as saying.

The launch was later expected in April and then in May but the campaign could not be taken up due to lockdown in parts of the country triggered

by the second wave of the pandemic.

"We have tentatively planned the GSLV-F10 launch on August 12, at 5.43 am, subject to weather conditions," an ISRO official was quoted as saying.

According to ISRO, GISAT-1 will facilitate near real-time observation of the Indian sub-continent, under cloud-free conditions, at frequent intervals.

GISAT-1 will be placed in a Geosynchronous Transfer Orbit by GSLV-F10 and it will be positioned in the final geostationary orbit, about 36,000 km above the Earth's equator. The earth observation satellite will provide the country near real-time images of its borders and also enable quick monitoring of natural disasters.

Experts said positioning the state-of-the-art agile earth observation satellite in geostationary orbit has key advantages.

"It is going to be a game-changer for India," an official of the department of Space was quoted as saying.

Listing the objectives of the mission, ISRO had earlier said the satellite would provide near real-time imaging of the large area region of interest at frequent intervals. It would help in quick monitoring of natural disasters, episodic and any short-term events.

The third objective is to obtain spectral signatures of agriculture, forestry, mineralogy, disaster warning, cloud properties, snow and glacier and oceanography.

US Trials Nano Satellites for Missile Defense

Inder Singh Bisht | 13 July 2021

Source: The Defense Post | https://www.thedefensepost.com/2021/07/13/nano-satellites-missile-defense/

The US Missile Defense Agency (MDA) launched two nanosatellites, known as CubeSats, last month as part of a demonstration to see their viability within the missile defense communications architecture, the Department of Defense revealed in a statement.

CubeSats are a miniaturized, low-cost subset of nanosatellites weighing up to 1.33 kilograms (2.9 pounds) per unit. A nanosatellite weighs less than 300 kilograms (661 pounds).

In the 90-day demonstration, which may be extended up to one year, the MDA will use two CubeSats "to demonstrate networked radio communications between nanosatellites while in orbit," the statement said.

Missile Tracking Space Sensor

The agency will ensure that the CubeSats "navigate properly, receive and send signals to radios and networks and operate as intended," the statement added.

CubeSats will play a crucial role in the Hypersonic and Ballistic Tracking Space Sensor payload functioning being developed by MDA.

The payload, to be deployed on satellites, will detect and track hypersonic and ballistic missiles and send critical information to the system.

CubeSats will play a crucial role in the Hypersonic and Ballistic Tracking Space Sensor payload functioning being developed by MDA.

"The missile defense architecture will require communications between interceptors, sensors and command and control systems to quickly identify, track and destroy incoming enemy missiles before they reach their targets," MDA director for space sensors, Walt Chai, said.

"The CubeSats will allow the agency to demonstrate the capabilities quickly and affordably."

Affordable Cost Crucial for Technology Maturation

CubeSats' lower cost than traditional satellites — $1.3 million versus hundreds of millions — makes it crucial for the maturation of technologies for future applications in missile defense.

"For the NTI (Nanosat Testbed Initiative) efforts, we only need something small to take technology experiments to space in order to test in the relevant environment and gather accurate data. CubeSats are the perfect platform for this," Shari Feth, head of the Innovation, Science, and Technology directorate at MDA, said.

Provides Unprecedented Testing Capability

NTI project lead Eric Cole explained, "The ability to leverage the rapid advances in commercial CubeSat technology, as well as the growing base of commercial small launch providers, enables a unique testing capability never before available."

"The ability to test in the relevant environment of space enables testing to achieve higher technology readiness levels, making the technology transition path into operational systems much more viable."

US Space Force sees UK as potential site to build a deep-Space radar

NewsDesk | 23 July 2021

Source: Geospatial World | https://www.geospatialworld.net/news/us-space-force-sees-uk-as-potential-site-to-build-a-deep-space-radar-eos/

US Space Force officials and UK government have started discussions about the building of a deep-Space radar site in UK, as reported by SpaceNews. The Deep Space Advanced Radar Concept (DARC) project started by the US Air Force in 2017

is a network of sensors, which is planned to be developed to track active satellites and debris beyond geostationary orbit.

The Space Force describes it as a 24/7, all-weather ground-based radar system for space domain awareness.

The Space Force recently issued a request for design concepts from contractors. Up to three radar sites could be built in the coming years. One would be in the United States and the other two in other parts of the world.

Air Chief Marshal Sir Michael Wigston, head of the UK Royal Air Force, was recently in the United States for talks over the plans, the Guardian newspaper reported. He said the British were "very interested" in the project and in hosting a US radar station.

"We have recently started exploratory discussions with the U.K. to determine the potential collaboration opportunities with the Deep Space Advanced Radar Capability," the spokesman was quoted as saying.

DARC will have three geographically separated sites around the world, "that will play a key role in moving towards a resilient space enterprise able to deter aggression," he said. "The DARC program office is working site selection of all three sites in parallel, and has not finalized the location of any sites at this time."

Gaganyaan 1st uncrewed mission unlikely before June 2022; no life support systems testing

Chetan Kumar | 22 July 2021

Source: The Times of India | https://timesofindia.indiatimes.com/home/science/gaganyaan-1st-uncrewed-mission-unlikely-before-june-2022-no-life-support-systems-testing/articleshow/84655380.cms

The first uncrewed mission part of the Gaganyaan programme, which ISRO was hoping to launch by December this year, has been postponed to next year. In fact, it is unlikely to be launched before June 2022. Scientists associated with the programme said while there has been progress made on the human rating of systems, especially the launch vehicle, there's still a lot of work pending. "...Which is why we are looking at the second half of 2022 for the first uncrewed mission. It could even be August," one of them said.

ISRO chairman K Sivan told TOI: "It's now impossible to carry out the first uncrewed mission this year as we've lost a lot of time because of lockdowns and work is only picking up now. It'll happen only next year around June."

This change is likely to impact the overall timeline of the programme, which initially hoped to send Indian astronauts to space by 2022.

Multiple scientists said that the first uncrewed mission may see the orbital module stay in orbit for multiple days — could even be as long as a week — but that not all systems that will eventually be part of the human spaceflight will be part of this mission. Sivan said: "It's likely to stay in orbit for a 'long time' as we'll test all systems for extremes. But we're yet to decide for how long we'll keep it there."

It's now impossible to carry out the first uncrewed mission this year as we've lost a lot of time because of lockdowns and work is only picking up now. It'll happen only next year around June.

He, however, confirmed that this mission won't be testing the crucial environment and life support systems. "...As far as life support systems go, it is more important to conduct extensive ground tests than to do an actual flight test — which is also critical — and we will, therefore, be testing those on the ground first and use it as part of the second uncrewed mission," Sivan said.

The development of these systems will be the most challenging part of human spaceflight, and Sivan said Isro is doing it indigenously. However, sources said ISRO could be getting help indirectly from other space agencies.

Flight Performance & Vyomitra

"The first mission is mainly for flight performance systems. The human-rated launch vehicle will be demonstrated. After injecting the module into orbit, we need to test the worldwide tracking networks. And, we need to test the return flight. Here we'll look at both the thermal protection and other systems of the module during its return, and also the recovery response after it lands back," Sivan said.

ISRO will also be testing both the audio and video links through the launch and the orbiting of the module. Vyomitra, the half humanoid designed by ISRO, is also likely to make it in the first mission.

"...We are aiming to send Vyomitra, but the crew module won't be pressurised (like it would be with astronauts) so not all aspects of human activity will be mimicked by the robot in the first mission," Sivan added.

Although ISRO has shortlisted some experiments, what may eventually make it as part of the first mission is yet to be decided.

Global Aerospace Industry

Boeing delivers 10th P-8I maritime patrol aircraft to Navy

Dinakar Peri | 09 July 2021

Source: The Hindu | https://www.thehindu.com/news/national/bo

eing-delivers-10th-p-8i-maritime-patrol-aircraft-to-navy/article35295620.ece

Aircraft manufacturer Boeing on Tuesday delivered the 10th long-range maritime reconnaissance anti-submarine warfare aircraft to the Navy. This is the second of the four additional aircraft contracted under an optional clause in 2016.

The remaining two were expected to be delivered in the last quarter of this year, a defence official said.

This is the second of the four additional aircraft contracted under an optional clause in 2016.

The patrol aircraft was an integral part of the Indian Navy's fleet and had surpassed 30,000 flight hours since its induction in 2013, Boeing said in a statement.

In May, the U.S. State Department approved the possible sale of six additional P-8I aircraft and related equipment, a deal estimated to cost $2.42 billion. In November 2019, the Defence Acquisition Council approved the procurement of six aircraft. The number was cut down from 10 to six due to budgetary constraints as also because the Navy was undertaking fleet rationalisation and deciding to go in for long endurance unmanned platforms.

The Navy had procured eight P-8Is under a $2.2 billion deal in 2009. The aircraft are part of the 312A Naval Air Squadron based at Arakkonam in Tamil Nadu. In 2016, the Navy exercised the optional clause for four more P-8Is in a deal worth over $1billion. The Indian Navy was the first international customer of P-8.

The Navy has also deployed P-8Is for humanitarian assistance and disaster relief missions.

Centre at Arakkonam

Boeing is completing construction of a 60,000 sq. ft. training support and data handling centre at INS Rajali, Arakkonam, and a secondary maintenance training centre at the Naval Institute of Aeronautical Technology, Kochi, as part of a training and support package contract signed in 2019.

This new indigenous, ground-based training would allow naval crew to increase mission proficiency in a shorter time, while reducing on-aircraft training time, resulting in increased aircraft availability, Boeing added.

At Aero India in February, Boeing announced strategic collaboration agreements with Air Works of India for the Maintenance, Repair and Overhaul (MRO) of the P-8I fleet and the VIP transport fleet of the Indian Air Force.

The six aircraft under discussion will come with extensive upgrades, officials had stated. As reported by The Hindu, the six P-8Is will

come installed with encrypted communication systems since India has now signed the foundational agreement Communications Compatibility and Security Agreement (COMCASA) with the U.S.

Who is buying Israeli counter-drone systems in South Asia?

Seth J.Frantzman | 13 July 2021

Source: Defense News | https://www.defensenews.com/unmanned/2021/07/13/who-is-buying-israeli-counter-drone-systems-in-south-asia/

JERSUSALEM — Israel Aerospace Industries has announced the sale of dozens of counter-UAV Drone Guard systems to an unnamed South Asian country.

The deal, announced in early July, was valued in the tens of millions of dollars. Israeli companies often don't identify their customers, leaving observers to speculate about who acquired the system in South Asia.

Drone Guard was originally built on adapted radar and existing electro-optical technology, but its manufacturer has updated the platform.

According to a source at IAI familiar with the matter, the company can only go so far as to partly discuss the process involved in selling this technology to South or Southeast Asian countries. "Threats are diverse, and actually what we have to do is show that we have a solution which is very comprehensive and long range, and on that deal we provided extended-range capability, which is not a usual requirement," the source said.

South Asia generally consists of Afghanistan, Bangladesh, Bhutan, India, Nepal, Pakistan, Sri Lanka and the Maldives. Israel doesn't have diplomatic relations with Afghanistan, Bangladesh and Pakistan, and has experienced intermittent positive relations with the Maldives.

IAI has previously done business with India: In 2017, the company won $2 billion worth of deals. In 2020, it discussed the Drone Guard system at the DefExpo conference in India, The Times of India reported. There has been online speculation that the system was sold to India, with local media platform ThePrint noting July 9 that the Indian Army "is in the process of procuring an unspecified number of anti-drone systems that will detect and jam the communication and navigation signals of a hostile unmanned aerial vehicle (UAV) or spoof it." The article did not identify the company or companies providing the systems.

Days before announcing the Drone Guard deal, IAI reported a deal to upgrade Sri Lanka Air Force planes. Sri Lankan media and defense officials have also expressed concern about rising drone threats in recent years.

Given the lack of reported drone threats or incidents in Bhutan, a relatively small country, and in Nepal, the number of potential South Asian countries seeking advanced counter-UAS technology and which have relations with Israel are relatively few. It's unlikely the customer is the Maldives because it is so isolated at sea and the threats it faces are more limited.

IAI has sold about 200 Drone Guard systems globally amid an increased interest by countries in defending against a plethora of emerging UAV threats. IAI says the multi-sensor, multilayered ELI-4030 Drone Guard system provides "the ability to detect, classify, identify and defeat drone attacks."

RAF eyeing electric trainer as carbon-reduction campaign powers up

Craig Hoyle | 13 July 2021

Source: Flight Global | https://www.flightglobal.com/defence/raf-eyeing-electric-trainer-as-carbon-reduction-campaign-powers-up/144570.article

The UK Royal Air Force (RAF) is exploring multiple pathways to reducing its environmental impact, with initiatives ranging from the planned introduction of electrically-powered light training aircraft to the "flight-free certification" of future combat assets.

Introducing a sustainability session during the virtual Farnborough Connect event on 13 July, minister for defence procurement Jeremy Quin said the Ministry of Defence accounts for 50% of all emissions made by UK central government departments, with the RAF's Air Command alone responsible for 41%.

Speaking during the same forum, RAF deputy commander Air Marshal Andrew Turner said a broad range of measures are already being explored in order to reduce the service's environmental footprint, including investing in the production of sustainable aviation fuel (SAF). This drive is being made in support of the UK government's commitment to achieving net-zero carbon emissions by 2050, but also offers operational benefits, he adds.

"We are going to endeavour to fly a 100% SAF-powered aircraft this side of Christmas, and move that fleet to 100% SAF in about two years' time," Turner says, without identifying the type involved. Flying the service's current assets with a 50:50 mix is already possible.

The RAF recently made an investment in a private company which has demonstrated the production of jet fuel from apples and lavender, with a laboratory product "more stable than jet fuel", Turner says. He notes, however, that today SAF typically costs around four-times as much per litre than Jet-A1 fuel, and that broader adoption of the technology is needed to close this price gap. "We need a momentum in society to be demanding of change such that airlines – the

whole industry – moves in this direction," he adds.

Turner says the RAF also is "driving very hard at making the Red Arrows' [coloured] smoke sustainable"; the aerobatic display team currently uses diesel and dye to achieve the effect.

The service is also looking to declare at least one of its bases net-zero by 2025, with the goal of over time having such facilities become net contributors to the national grid, through generating power by solar, heat pumps and wind.

We are going to endeavour to fly a 100% SAF-powered aircraft this side of Christmas, and move that fleet to 100% SAF in about two years' time.

"We believe that through these mechanisms, relatively rapidly we can generate substantially more power than our bases currently consume," he says.

Other measures are also being considered, such as the idea of replacing grass next to runways with moss, which has much greater carbon-capture characteristics. Such a step also would remove the need for regular machine-mowing, and could reduce wildlife-related hazards.

But in one of the most visible signs of change for the RAF, Turner reveals that it is investigating the acquisition of electric-powered aircraft to replace its Babcock-operated Grob Aerospace Tutor T1 fleet, which is used for elementary flight training and to provide air experience flights for cadets and instruction for university air squadron students.

"We will have a competition," Turner says, with the ambition of fielding a new type "before the end of this parliament, or early in the next". The next UK general election is due no later than May 2024. He adds: "If battery technology moves faster then we will move with it."

He also sees a potential for using electrically-powered swarming drones, "for base security, or in a combat and operational sense to hazard an adversary's systems".

Turner also believes it will be possible to achieve "flight-free certification" of the UK's Tempest future combat air system and Mosquito loyal wingman, thanks to the use of digital-twin technology. This will enable test flights to be conducted only to validate software modelling, which also offers an operational advantage to the military. He notes: "there will be components or facets – signature particularly – that we simply don't want to show in the public domain, because it will compromise its capabilities" to potential adversaries.

Quin identifies the UK's broader Future Combat Air System initiative as an example of a defence programme "providing brilliant

opportunities to innovate low-carbon technologies and pioneer climate-mitigation methods".

"Defence is faced with a unique set of challenges – to develop capabilities that match the evolving threat in increasingly severe conditions" and in line with carbon emission-reduction goals, Quin says. "How do we adapt our current aircraft fleet to ensure greater efficiency doesn't come with a reduction in effectiveness?"

Russia on Track to Deliver Fighter Jets to Myanmar – Reports

23 July 2021

Source: The Moscow Times | https://www.themoscowtimes.com/2021/07/23/russia-on-track-to-deliver-fighter-jets-to-myanmar-reports-a74597

Russia is going ahead with plans to deliver Sukhoi Su-30 fighter jets to Myanmar's increasingly isolated military regime, a top defense cooperation official was quoted as saying Friday.

Moscow has continued to support Myanmar with arms deals and military delegation visits following the ouster of civilian leader Aung San Suu Kyi and President Win Myint this year.

According to Deutsche Welle, Dmitry Shugayev, the chief of Russia's Federal Service for Military-Technical Cooperation, said Russia "continues to implement plans" toward delivering Su-30 jets and Yak-130 training aircraft to Myanmar.

Russia had agreed to sell six Su-30 aircraft to Myanmar in 2018, when the army was in the middle of a military offensive against Rohingya militants that the United Nations called ethnic cleansing.

Shugayev added that Myanmar's air force currently operates Russian-made Yak-130 and MiG-29 fighter jets.

After the military coup in February, Russian customs data showed the Myanmar junta importing $14.7 million in radar equipment that month. That followed the delivery of $96 million worth of classified defense-related goods in December.

After the military coup in February, Russian customs data showed the Myanmar junta importing $14.7 million in radar equipment that month.

International watchdogs say Myanmar has spent $807 million on Russian arms imports over the past decade, making Russia the country's No. 2 military exporter after China.

During his visit to Naypyitaw in January, Russian Defense Minister Sergei Shoigu agreed to supply Myanmar with Pantsir-S1

surface-to-air missile systems, Orlan-10E surveillance drones and radar equipment.

The United States has suspended a trade deal with Myanmar until democratic leadership is restored and several Singaporean companies, including a firm that sold anti-drone products to Myanmar's police, have canceled their deals.

The European Union has accused Russia of blocking a coordinated international response to the Feb. 1 coup in Myanmar and the turmoil it has faced since. Rights groups meanwhile accuse Moscow of "legitimizing" the country's "brutal and unlawful attempted coup."

Indian Aerospace Industry

Astra Mk1 Integration with Tejas Nears Completion, Both Israeli FCR to be Enabled

Ele Times Bureau | 13 July 2021

Source: Ele Times | https://www.eletimes.com/astra-mk1-integration-with-tejas-nears-completion-both-israeli-fcr-to-be-enabled

Indian state-owned Hindustan Aeronautics Limited (HAL) had confirmed in the past that Indigenous Astra Mk1 beyond visual range air to air missile integration work with a Limited Series Production (LSP) Tejas Mk1 is presently being carried out, Industrial sources, do confirm that captive flight trials of the missile might happen in next few weeks that includes 4-5 rounds of test-firing that has been planned with the present ELTA-LRDE 2032/MMR Fire control Radar (FCR) soon after that.

All 36+18 (Trainers)in Tejas Mk1 configurations will get Astra Mk1 BVR that are equipped with the ELTA-LRDE 2032/MMR Fire control Radar (FCR), and by 2023 it will also be integrated with the ELTA-2052 AESA Fire control Radar (FCR) that has been planned for the first lot of 20 units of the Tejas Mk1A fighter jet. Indigenous UTTAM AESA FCR that will be equipped on remaining 53 Tejas Mk1A fighter jets will also get a host of Indian-made weapons that includes Astra Mk1 and Astra Mk2 BVR when it enters production in 2025.

HAL will deliver 16 FOC Single seater Tejas Mk1 after which it will start manufacturing 18 Tejas Mk1 Trainer aircraft posts which, will start manufacturing Tejas Mk1A fighter jets. HAL earlier this year, had secured a deal for 73 upgraded Tejas Mk1A Single seater jets along with 10 Tejas Mk1 Trainer jets. Astra Mk1 will also be enabled on IOC-II configured Tejas Mk1 Squadron when it moves to forward positions for active combat duties, so certification of the Astra Mk1 on Tejas Mk1 plays a significant role to boost combat performance of Tejas Mk1 fleet that are presently equipped only with Derby BVRs.

BrahMos ER Test Fired off Odisha Coast

Ele Times Bureau | 13 July 2021

Source: Ele Times | https://www.eletimes.com/brahmos-er-test-fired-off-odisha-coast

The updated version of supersonic cruise missile 'BrahMos' test fired off Odisha coast on Monday. The missile which has a target range of 400 kilometres was test fired from the launchpad number-5 of the Integrated Test Range (ITR) of Chandipur in Balasore.

BrahMos Aerospace has developed the missile and it as a joint venture between Defence Research and Development Organisation (DRDO) of India and NPO Mashinostroeyenia (NPOM) of Russia. The missile, which is a medium-range supersonic missile that can be launched from submarines, ships, aircraft or land-based platforms, has been named after two rivers, the Brahmaputra in India and the Moskva in Russia.

BrahMos is considered to be the fastest supersonic missile in the world that can achieve a speed 2.8 times the speed of sound.

According to reports, the land attack version of BrahMos has the capability of cruising at 2.8 Mach speed and with the upgraded capability, the missile can hit targets at a range of upto 400 kilometers with precision.

HAL set to deliver first batch of 3 Light Combat Helicopters to IAF

Dinakar Peri | 12 July 2021

Source: The Hindu | https://www.thehindu.com/news/national/hal-set-to-deliver-first-batch-of-3-light-combat-helicopters-to-iaf/article35265426.ece

Hindustan Aeronautics Limited (HAL) is gearing up to deliver the first batch of three Light Combat Helicopters (LCH) to the Indian Air Force (IAF) once acceptance tests are completed. These are part of the 15 Limited Series Production (LSP) helicopters approved for the Army and the IAF.

"HAL has received Letter of Intent for five Air force and five Army LCH for delivery pending contract finalisation of 15 Limited Series Production (LSP) LCH. HAL has produced and signalled out three LSP LCH for the IAF. Same will be subjected to customer acceptance and training shortly," a HAL source said.

On the remaining helicopters of the LSP series, the source added, "In the current year we are producing four LCH for Army and two for the Air Force. Remaining six LCH will be produced next year."

Delayed deal

The deal for the 15 LCH was expected to have been signed in the first quarter of 2021 but has been delayed due to the second wave of the pandemic.

The IAF has put forward a requirement for 65 LCH and the Army for 114 helicopters. Of the 15 LSP helicopters, 10 are for the IAF and five for the Army. The LCH, the lightest attack helicopter in the world weighing 5.5 tonnes, has been designed and developed by the HAL to meet the specific and unique requirements of the Indian armed forces and can operate at heights of 12,000 feet.

The deal for the 15 LCH was expected to have been signed in the first quarter of 2021 but has been delayed due to the second wave of the pandemic.

The Army Aviation operates smaller utility helicopters but does not have attack helicopters in its fleet and has for sometime pitched for attack helicopters of its own to operate with its strike Corps. The attack helicopter fleet is operated by the Air Force which provides close air support to the Army.

The IAF operates the older Mi-25 and Mi-35 Russian attack helicopters which are in the process of being phased out and has inducted 22 AH-64E Apache attack helicopters from the U.S. The Army will also start receiving the Apache attack helicopters from early 2023 onwards, six of which have been contracted under an estimated $800 mn deal from the U.S. in February 2020.

Presently, the Army has 90 Advanced Light Helicopters (ALH) and 75 Rudra, weaponised ALH, helicopters in service which are indigenously designed and developed by the HAL in addition to around 160 older Cheetah and Chetak utility helicopters which are in need of urgent replacement.

Last August, amid the ongoing standoff with China in Eastern Ladakh, two LCH were deployed for operations at high altitude in Leh at short notice to support IAF missions, validating their capability.

Pandemic helps ISRO pursue privatisation plans

Amarnath K Menon | 21 July 2021

Source: India Today | https://www.indiatoday.in/india-today-insight/story/pandemic-helps-isro-pursue-privatisation-plans-1830960-2021-07-21

The Indian Space Research Organisation (ISRO) is looking at a major launch ahead of Independence Day. On August 12, its workhorse Geosynchronous Satellite Launch Vehicle (GSLV F-10) will lift off from the Satish Dhawan Space Centre (SDSC), the spaceport at Sriharikota, Andhra Pradesh, and lob the Earth Observation Satellite (EOS-03) into orbit. It will provide near real-time observation of the Indian subcontinent under cloud-free conditions, and at frequent intervals.

This will enable quick monitoring of natural disasters, episodic events and any short-term events. It will obtain spectral signatures for agriculture, forestry, mineralogy, disaster warning, cloud properties, snow and glaciers and oceanography. It will also ensure a quantum jump in disaster mitigation.

Weighing about 2.27 kgs, EOS-03 is India's first state-of-the-art agile earth observation satellite. It will first be placed in a highly elliptical geosynchronous transfer orbit before the satellite reaches the final geostationary orbit, about 36,000 kms above Earth, using its onboard propulsion system.

A draft policy for private players, commercial launch projects, they are all taking form. A major satellite launch is also planned before I-Day.

The launch of the satellite was scheduled for March 5 last year but was cancelled because of a technical glitch a day earlier. The Covid-19 outbreak and the resultant lockdown forced ISRO to put off the launch further. With the marked improvement in workforce attendance at the SDSC after the second wave of the pandemic, the integration of EOS-03 and the launch vehicle and stage-wise checking of all parameters is progressing rapidly. If all goes well, GSLV F-10 / EOS-03 will be the third take off from the spaceport this year. This launch is poised to be a game-changer in some ways. With onboard high-resolution cameras, the satellite will allow the country to monitor the Indian landmass, its oceans and its borders continuously.

ISRO had launched PSLV-C51 with Brazil's Amazonia-01 and 18 other satellites on February 28 and the Sounding Rocket RH-560 Sourex on March 12 this year. The GSLV F-10 / EOS-03 launch was rescheduled for March 28 this year, subject to weather conditions. A minor issue with the satellite prompted the space agency to plan the launch for April 18 but that was date put off again due to the second wave Covid-induced lockdown.

The Covid pandemic had crippled the majority of ISRO's space activities in 2020 and continues to have an impact on the space agency's core activity in 2021 as well. However, it has helped ISRO pursue its privatisation plans. "Our teams worked from home and utilised the time to come out with draft policies to usher in private players," says ISRO chairman K. Sivan. Apart from coming out with the draft policy to allow private players and transfer medical equipment technologies, the time was used to chart a decadal plan.

This includes development of a heavy-lift rocket, reusable satellite launch vehicle, semi-cryogenic engine, and development flight of the Small Satellite Launch Vehicle (SSLV). Meanwhile, the prestigious Indo-US collaboration, the NASA-ISRO Synthetic Aperture Radar (NISAR) Mission,

moved ahead with the space agency sending the S band SAR payload.

While the department of space (DoS) recently came out with the 'Draft National Space Transportation Policy-2020', it also has a committee going into the provisions of the Space Activities Bill with legal consultations under way to finalise it. Last year, the government unveiled the draft Space-based Communication Policy of India 2020 (Spacecom Policy-2020), the draft Space-based Remote Sensing Policy and the Revised Technology Transfer Policy guidelines.

Preparations have also begun to constitute a full-fledged Indian National Space Promotion and Authorisation Centre (IN-SPACe), which will be the regulatory body for private players, and will be used to enlist those from within and outside the space agency.

Meanwhile, DoS's commercial arm, New Space India Limited (NSIL), apart from buying satellites made by ISRO, will also lease assets from it. "NSIL will acquire three communication satellites—GSAT-20, GSAT-22 and GSAT-24--and operate them. "We expect an investment of about Rs 2,000 crore each year over the next five years and we plan to hire 300 highly skilled people," says NSIL chairman and managing director G. Narayanan. As a central public sector enterprise, the company aims to fund its five-year expansion activities through a combination of debt and equity.

NSIL plans to own and operate launch vehicles and satellites to offer a complete range of commercial services. This is expected to help free research teams from routine activities to focus on cutting-edge research. It is also to transition progressively from supply-driven to demand-driven mode. NSIL has already begun negotiations with users on communication satellite capacities to finalise requirements for new satellites (mostly communication satellites). Since inception, NSIL has extended launch services to 45 customer satellites through four Polar Satellite Launch Vehicle missions with Amazonia-1, the orbiting Brazilian satellite, its first commercial mission.

Russia Formally Offers 21 MiG-29 Aircraft to India

Inder Singh Bisht | 23 July 2021

Source: The Defense Post | https://www.thedefensepost.com/2021/07/23/russia-india-mi29-fighters/

Russia has presented India with an offer of 21 MiG-29 fighters, Asia News International reported citing a spokesperson for Russia's Federal Service for Military-Technical Cooperation.

India is currently considering the offer, according to the outlet.

The offer comes a year after India's council for defense purchases approved the acquisition of the fighter along with 12 Su-

30MKI fighters amid a border standoff with China.

Upgrades

India currently operates 69 MiG-29s, first inducted in 1985, which are now undergoing upgrades.

The upgraded aircraft, known as the MiG-29 UPG, will feature air-to-air refueling capacity, cutting-edge avionics, and advanced weapons, equipping it for beyond-visual-range combat.

Leftover Mig-29 Airframes

Although Russia has long ceased producing the aircraft, 21 of its airframes have remained in storage since the 1980s.

The airframes, judged to still be in good condition, will be fitted with equipment and systems as part of the deal, The Print reported.

The aircraft will be manufactured according to the most recent MiG UPG standard under which the Indian Air Force currently operates before delivery to India.

DRDO successfully flight tests new generation surface-to-air Akash missile

PTI | 23 July 2021

Source: The Print | https://theprint.in/defence/drdo-successfully-flight-tests-new-generation-surface-to-air-akash-missile/701740/

India on Friday successfully flight tested the New Generation Akash (Akash-NG) missile from the Integrated Test Range, Chandipur, off the Odisha coast, DRDO sources said.

The test was carried out by Defence Research and Development Organisation (DRDO) against a high-speed unmanned aerial target which was successfully intercepted by the missile.

The surface-to-air missile was also successfully flight-tested two days ago from the same launch ground of ITR at Chandipur near here, sources said.

The flight trial was conducted from launch pad 3 of the ITR with all weapon system elements such as Multifunction Radar, Command, Control and Communication System and launcher participating in deployment configuration, they said.

The missile, equipped with a radio frequency seeker, successfully intercepted a high speed unmanned aerial target, a DRDO spokesperson said.

On July 21, the missile was flight-tested without the seeker, meeting all the mission requirements.

Defence Minister Rajnath Singh congratulated DRDO, Indian Air Force and the Industry on the second successful flight test of Akash-NG in a span of three days.

The missile system has been developed by Defence Research and Development Laboratory (DRDL), Hyderabad, in collaboration with other DRDO laboratories.

The missile has been indigenously manufactured by Defence Research and Development Laboratory (DRDL), Hyderabad, in collaboration with other DRDO laboratories.

The test was carried out amid inclement weather conditions proving the all-weather capability of the weapon system.

In order to capture flight data, ITR deployed a number of Range stations like Electro Optical Tracking System, Radar and Telemetry.

The flawless performance of the entire weapon system has been confirmed by complete flight data captured by these systems. During the test, the missile demonstrated high manoeuvrability required for neutralising fast and agile aerial threats, sources said.

The launch was witnessed by the representatives of the Indian Air Force. Once deployed, the Akash-NG weapon system will prove to be a force multiplier for the air defence capability of the Indian Air Force.

Production agencies Bharat Electronics Limited and Bharat Dynamics Limited also participated in the trials.

Secretary, Department of Defence R&D and DRDO Chairman, Dr G Satheesh Reddy, also congratulated the teams for the successful trial of Akash NG which is capable of intercepting high speed and agile aerial threats.

HAL is all set to respond to Royal Malaysian Air Force's RfP for LCA

Huma Siddiqui | 21 July 2021

Source: Financial Express | https://www.financialexpress.com/defence/hal-is-all-set-to-respond-to-royal-malaysian-air-forces-rfp-for-lca/2295082/

By the end of September 2021, the state-owned Hindustan Aeronautics Limited (HAL) is expected to respond to a Request for Proposal (RfP) from the Royal Malaysian Air Force (RMAF). The Malaysian Air Force has sent out a global request for low-cost light fighter aircraft.

Speaking on condition of anonymity, a top officer has confirmed to Financial Express Online "The Company will be responding to the RfP from RMAF for the Light Combat Aircraft (LCA) `Tejas'. And it has to be sent at the end of September."

As has been reported earlier this year, on the sidelines of the 13th edition of Aero-India, R Madhavan, chairman of Hindustan Aeronautics Limited (HAL), has told Financial Express Online that "Several

Southeast Asian and Middle East countries evinced interest in the indigenous LCA `Tejas' Mk 1A fighter aircraft."

"At a vanilla price of just Rs 309 crore per aircraft, the export version of the fighters are going to be different from those which are going to be inducted in the Indian Air Force (IAF)," he added.

While the aircraft will be exported at the price of Rs 309 crore (making it the cheapest fighter globally), there will be extra charges for the services to be provided overseas.

The RMAF had first expressed interest in `Tejas' LCA from HAL in 2019. For the first time ever `Tejas' showcased its might during the Langkawi International Maritime and Aerospace Exhibition (LIMA) in Malaysia.

The Malaysian Air Force has sent out a global request for low-cost light fighter aircraft.

The South Asian country has invited proposals from various competitors including: FA-50 light attack aircraft developed by Korea Aerospace Industries (KAI); M-346FA Fighter Attack aircraft variant developed by Leonardo, of Italy; Yak-130 combat trainer aircraft developed by United Aircraft Corporation of Russia; and JF-17 of China.

India's 'Tejas' had its first international exposure during the Bahrain International Air Show back in 2016.

More about the LCA Programme

Because of the government's efforts, the Tejas program has received a major shot in the arm in boosting the Atamanirbhar drive in the aerospace and aeronautics.

According to a top officer, "The production rate for this increased requirement by IAF is being augmented by HAL from 8 to 16 aircraft every year through the creation of a state-of-the-art new facility in Bengaluru."

Tejas would have the highest level of indigenisation in comparison to any programme of this scale with progressive indigenisation of critical technologies, thereby making India a technologically self-reliant nation. The programme would check out the developing technologies indigenously.

"LCA-Tejas program follows the system integrator model and has created a national aerospace ecosystem with the participation of more than 560 companies from large to SMEs which encompass all the facets of aircraft design and manufacturing. It is estimated that once the LCA MK1A program in India kicks-off, primary jobs to a tune of 5000 are expected to be generated across the country. The programme will foster local industry and drive skill development of young Indian workforce."

"More than 200 Indian companies are involved in tooling, GSEs, and GHEs supplies for the program. Till date the LCA program is estimated to have produced 50,000 primary and secondary jobs across the nation. And, in the country's aerospace history, the LCA-program enabled partnership with Indian private players manufacturing aircraft fuselage and wings. Some of the major companies contributing in the LCA programme from the private sector are VEMv technologies, L&T, DTL, Alpha Toccol, TAML, Data Patterns, Pendios, Compupower and many others," said the officer quoted above.

What is Malaysia looking at?

The country is planning to buy 36 light combat aircraft (LCA) which will be added to its existing fleets in the Air Force.

According to reports, Malaysia is assessing India's Tejas, Chinese JF-17 and F/A 50 of South Korea.

If and when the LCA gets exported, the whole programme will get a much-needed boost and HAL will get international recognition in the global market for its design capabilities and the product will also get validated.

Tejas specifications & Speed:

It is an advanced Fly-by-wire (FBW) fighter which has been designed, developed, and manufactured by the Aeronautical Development Agency (ADA) and HAL.

It is a 4+ generation fighter and comes with a glass cockpit with Satellite aided Inertial Navigation System.

It is capable of firing Beyond Visual Range (BVR) missiles, can carry air-to-surface, air-to-air, precision-guided and standoff bombs and precision-guided munitions. It can hit targets over land or sea.

The aircraft can be refuelled mid-air which will increase its combat radius.

The Made in India aircraft has a height 4.40 metre, wingspan of 8.20 metre, and length of 13.20 metre, and maximum speed is supersonic at all altitudes. It has a service ceiling of 50,000 feet and 'g' limits +8/-3.5.

Technology Development

An automated flight control system for drone swarms has been developed

19 July 2021

Source: EurekAlert | https://www.eurekalert.org/news-releases/761975

"The project's main objective is to integrate a certain degree of automation, so that an operator can control a small fleet of up to 10 drones from a single ground station," says Luis E. Moreno, LABYRINTH's coordinator and researcher at the UC3M's Robotics Lab. "The idea is that the operator indicates the mission to be undertaken (for

example, monitoring traffic in a particular area) and the system automatically converts this mission into a set of routes that each drone has to follow, automatically calculating alternative routes when necessary," he explains. In addition to planning and controlling routes, two other areas of technology are being subject to work: communication using 5G networks (so that drones are connected at all times) and the computer security behind the entire system.

Researchers have already developed an initial strategy for planning routes and preventing collisions for drone swarms in three-dimensional environments, in an article published in the Sensors journal. In order to do this, they first designed a 3D model that simulates an urban environment, where they established take-off and landing zones. Then they tested a planning algorithm that was responsible for calculating optimal, fluid routes for a set of drones. Finally, they implemented different measures (flights at different altitudes, distance control, etc.) to obtain a strategy for avoiding possible collisions.

Air controllers use ATM (Air Traffic Management) to safely manage the traffic of commercial aircraft. Similarly, developing an Unmanned Traffic Management (UTM) system that allows drones to share airspace with other drones and aircraft is imperative

Researchers at the LABYRINTH project are developing these technologies within the framework of U-Space, a new European drone air traffic management system led by the SESAR (Single European Sky ATM Research) initiative. This new framework is designed to integrate low-level drone operations, below 120 metres (400 feet), safely and efficiently into European airspace.

"Air controllers use ATM (Air Traffic Management) to safely manage the traffic of commercial aircraft. Similarly, developing an Unmanned Traffic Management (UTM) system that allows drones to share airspace with other drones and aircraft is imperative," explains Francisco Valera, another scientist taking part in this project and a member of NETCOM (Networks and Communications Services) at the UC3M. This research group, along with Telefonica I+D and the IMDEA Networks Institute, recently presented an experimental study about the use of mobile technologies in drone networks in the Sensors journal.

Possible applications

Drones can be useful in different applications, such as delivering and transporting goods, monitoring in different environments, or accessing places that are difficult to reach in emergency situations, for example. However, there have been concerns about the safety of these flights until now, which have limited their use and it is often illegal to use drones in certain public areas. It is estimated that by 2035 there will be approximately 400,000 drones

flying within Europe, so the biggest challenge in this regard will be safely managing drone traffic in cities and other areas with high levels of congestion.

The foreseen applications within the LABYRINTH project framework concern different environments in Spain. For example, work is being undertaken with the Directorate-General for Traffic (DGT, in its Spanish acronym) to use drones to improve road transport, analysing aspects such as speed control, measuring the distance between vehicles, identifying license plates, and following up on and providing support in the event of accidents. Another initiative with the National Institute of Aerospace Technology (INTA, in its Spanish acronym) is intending to use drones at airports to control unauthorised access, inspect tracks, or use them as a deterrent against birds. In the case of managing emergencies at large gatherings (such as at concerts or sporting events), a collaboration with the SAMUR-Protección Civil of Madrid is in place for pre-emergency surveillance operations (identifying exit routes, medical care points or danger zones, calculating street capacity) and assistance with medical operations (faster routes to incidents, transporting specialised material or medicine).

LABYRINTH (Ensuring drone traffic control and safety) is a project funded by the European Union's H2020 Programme (GA 861696) that is being coordinated by the UC3M. This R&D&I consortium is made up of 13 research centres and industrial partners from 5 countries (Germany, Austria, Belgium, Spain, and Italy). The Spanish institutions that are participating, along with the UC3M, are the Directorate-General for Traffic (DGT), the National Institute of Aerospace Technology (INTA), the SAMUR-ProtecciónCivil of Madrid and the companies Expace on Board Systems, Inncome, PONS Seguridad Vial and Telefonica I+D. The Western Ligurian Sea Port Authority (Italy), the German Aerospace Center (DLR), the German Institute for Standardization (DIN), the Austrian Institute of Technology (AIT), and the European Organisation for the Safety of Air Navigation (EUROCONTROL) are also taking part in the project.

Directed Energy: From Counter-Drone To Force Fields?

Theresa Hitchens | 23 July 2021

Source: Breaking Defense | https://breakingdefense.com/2021/07/directed-energy-from-counter-drone-to-force-fields/

The Air Force and Army are rapidly pushing to expand development of directed energy weapons beyond the high-priority counter-drone mission, officials said yesterday.

“The Air Force and the Army both, we have ongoing efforts to build counter-UAS systems,” Craig Robin, head of directed energy at the Army Rapid Capabilities & Critical Technologies Office (RCCTO), explained during a webinar sponsored by

Defence iQ. "UAVs are in the threat set … they're just not the only threat."

Meanwhile, the Air Force Research Laboratory (AFRL) is looking to the future of DE weapons in a new paper released last Friday, Directed Energy Futures 2060. It sees promise in a broad array of future missions from AI-driven laser systems to enable machine-speed drone kill chains to space-based missile defenses (a concept that has gone in and out of fashion for decades).

Most eyebrow raising is AFRL's prediction that DEW could be used by 2060 to create "force fields" to protect bases by repelling incoming drones and munitions — or even eventually improved to develop a kind of "nuclear umbrella."

We're painting with broad strokes, but we're diving into what missions of the future will look like. The technology is not quite Star Wars, but we're getting close.

Different Targets, Different Requirements

DoD tapped the Army to lead the the Joint Counter-small Unmanned Aerial Systems Office (JCO)last January. It is exploring numerous technological approaches to that small UAS mission, from metal 'nets' that tangle rotors to low-power lasers (in the 10-20 kilowatt range, Robin said.)

Current DE systems under development for countering unmanned aerial systems (c-UAS) have ranges "nearing 1 kilometer," AFRL's study explains, as opposed to other types of counter-UAS capabilities — such as net guns and shotguns — which are only effective at "10s of meters ranges."

"In 2020, it is possible to build a 100's of kilowatt class laser weapon system that can create destructive effects at tactically relevant distances, which if deployed could enable certain offensive and defensive operations. By tactically relevant distances in this instance, we mean up to a few kilometers," the AFRL study added.

Jirjis said a continuing challenge for laser weapons, however, "is being able to hit multiple threats at one time." (Hence, Air Force and Army interest in high-powered microwaves.)

"You can do that by linearly prosecuting them one at a time, you can get that maybe more spectrally trying to hit at multiple lasers," he said. "I think that's where some of the capabilities may also go, with … technologies to be able to actually meet some of those challenges."

Beyond c-UAS, where much of DoD's focus is today, other targets — for example, artillery or cruise missiles — require developers to look at different designs and power levels as they go forward, Robin said. "Shooting artillery is harder than shooting UAVs; … shooting a cruise missile is harder than shooting a UAV."

Targeting missiles, for example, would require much longer-range capabilities. Longer range requirements also mean higher power requirements. For airborne systems, atmospheric turbulence and beam dispersion also become problems — whether the target is ballistic missiles or air-to-air missiles.

Field Experiments

The Air Force thus is deeply involved in a "directed energy experimentation campaign," said Michael Jirjis, former head of that campaign, but now Air Force Life Cycle Management Center's Architecture & Integration Directorate lead for base defense. He explained that the concept is to "very quickly" test DE systems first in the US with operators, and then rapidly deploy them overseas on a "staggered" basis. A number of laser systems, he added, are "currently going on a 12-months overseas field assessment."

Five DEWs were to be tested throughout the effort – three versions of the HELWS and two different high-power microwave systems.

In February, for example, the service's Directed Energy Combined Test Force (DE-CTF), inaugurated in 2018 at Kirtland AFB in New Mexico, tested the High Energy Laser Weapon System 2 — also known as HELWS2 or H2. HELWS2 is a c-UAS directed energy weapon developed by Raytheon Intelligence & Space. (The first iteration of HELWS was certified for combat ops last September.)

"H2 was tested as part of a directed energy experiment that began in the spring of 2020 and was managed by the Strategic Development Planning & Experimentation, or SDPE, office. This experiment has involved taking commercial off-the-shelf systems and deploying them to several combatant commands, or COCOMs, for training, testing and evaluation for a one-year period," the service said in a press release.

"Five DEWs were to be tested throughout the effort – three versions of the HELWS and two different high-power microwave systems. Four systems were tested in 2020, three of which have been deployed," the release added.

One of those high-power microwave experiments, the Tactical High Power Microwave Operational Responder (THOR), is being developed with the Army, and is aimed at the hard problem of taking down swarms of small drones. It is expected to be sent abroad (most likely to Africa) sometime this year. after months of delay caused by the COVID-19 pandemic

"We're starting to see they've had success, that the operators like them, that they are sustainable enough in the field that we're willing to actually keep those going, are starting to transition over to the Component

and Combatant Commands to to actually keep those as a real world asset," Jirjis said.

But all the services are rapidly advancing on multiple types of directed-energy weapons for different missions. While DoD doesn't release an aggregated budget for directed energy (DE) research and development efforts, a rough run through the 2022 budget justification books shows nearly $800 million requested by the Army, Navy, Air Force and DoD's Research & Engineering office (OUSDR&E).

Robin was equally bullish on the ability to rapidly move laser systems for base defense in particular to the field. "In my opinion, here we are right now is this: the system's … that are out there now in forward operating areas now, I think those folks are really gonna like them, and they're gonna want more of them," he said. The services, he said, "need to be ready to respond to that demand signal, because it is a capability for this problem that just doesn't exist right now."

From Star Wars To Force Fields

AFRL, for its part, sees rapid development of DEW over the next 40 years. The study looks at potential progress toward weapons based on lasers, high powered microwaves and particle beam weapons — although for the latter, AFRL says that despite years of research such weapons remain unproven and are likely to still be in the realm of science fiction even in the 2060s.

"Even with a pessimistic estimate of the advance in DE science and technology, DE capabilities will have significant military utility in the battlespace of the future, due to the unique capabilities of DE systems in terms of precision, range, flexibility, scalability of effects, deep magazine, and active probing of the battlespace across all domains and phases of conflict. Today, DE weapons are used by all major military powers for a variety of effects," the study concludes.

For lasers and high-powered microwaves, however, AFRL sees great potential — including for future weapons systems that use artificial intelligence to identify and target enemy threats at machine speeds.

"We're painting with broad strokes, but we're diving into what missions of the future will look like. The technology is not quite Star Wars, but we're getting close," said Jeremy Murray-Krezan, AFRL's directed energy deputy chief scientist, said in the lab's press release.

"By 2060 we can predict that DE systems will become more effective, and this idea of a force field includes methods to destroy other threats too," he said. "Eventually there may be potential to achieve the penultimate goal of a Nuclear or ballistic missile umbrella. It's fun to think about what that might be in 2060, but we don't want to speculate too much."

The report itself is a bit more sober:

"Future trends in DEW technology will follow mission needs. The 'holy grail' from a military utility perspective is a DE weapon system effective enough, favorable from a SWAP perspective, and affordable enough to provide a nuclear/missile umbrella. Although a concept often associated with science fiction, in fact ground and ship-based DE defense systems effectively act like point-localized force fields against small and relatively soft targets today. Airborne and space-based DE platforms could achieve a greater area defense and multipoint defenses, for a broader coverage missile umbrella. However, these concepts require significant technical advancement by 2060 to achieve the full range of power contemplated."

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Centre for Air Power Studies (CAPS) was established in 2001 as an autonomous defence research and analysis body for research and focused analyses on issues related to national security, defence, and aerospace issues in the evolving strategic and international security environment. Its objective is to facilitate greater understanding of these issues amongst the Armed Forces, the strategic community and the public besides contributing to policy generation and decision-making.

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