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> *"Air power is indivisible. If you split it up into compartments, you merely pull it to pieces and destroy its greatest asset--its flexibility."*
>
> *— Field Marshal Bernard Montgomery*

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Opinion

Theatre commands need careful planning

Air Vice Marshal Anil Golani (retd)

Additional Director General, Centre for Air Power Studies | 12 August 2021

Source: The Indian Tribune | https://www.tribuneindia.com/news/comment/theatre-commands-need-careful-planning-279723

While democracies are considered to be the most evolved means of governance, nations not only take pride in their evolution as mature and evolved democracies, but also exhort others to follow suit. What ensues, however, is changing public perceptions based on a popular mandate which might sway the course of nations to paths unknown and may not deliver the promised results. Something similar seems to be underway in the national military discourse on the formation of integrated theatre commands. The examples being quoted to buttress the logic emanate from the integrated theatre commands of the US and China. A brief exposure to the structure and organisation in these countries is essential before we make an attempt to replicate them, if at all, in the Indian context.

The first country in the world to contemplate the creation of theatre/functional commands was the US. This was done through the Unified Command Plan (UCP) which is a strategic document that establishes the missions, responsibilities and geographical areas for the commanders of the combatant commands. The UCP is a classified executive branch document prepared by the Chairman of the Joint Chiefs of Staff and is reviewed every two years. The recommendations are made directly to the President through the Defence Secretary on any necessary changes. The country presently has seven geographical and four functional commands. Functional combatant commands operate across geographic boundaries and provide unique capabilities while the geographic combatant commands operate in clearly delineated areas of responsibility having a regional military focus. Each of these has the requisite force levels and an integral command, control, communications, computers, intelligence, surveillance and reconnaissance (C4ISR) network. Geographical commands are under a single commander and can seek assistance from a functional command when required.

The People's Liberation Army (PLA) of China was initially organised according to military regions that fluctuated from 13 to seven to five. In 2014, the military regions were reduced to five and a need was felt to have joint command with ground, naval, air and the Second Artillery Corps forces. This was planned to change their concept from primarily ground-oriented defence to a coordinated move of all services and enhance air and naval capabilities into the East China Sea.

The People's Liberation Army (PLA) of China was initially organised according to military regions that fluctuated from 13 to seven to five. In 2014, the military regions were reduced to five and a need was felt to have joint command with ground, naval, air and the Second Artillery Corps forces. This was planned to change their concept from primarily ground-oriented defence to a coordinated move of all services and enhance air and naval capabilities into

the East China Sea. In February 2016, the military regions were changed to replicate the US model by creating five geographical peace-time commands, the major difference being that they are all within mainland China, having divided the country into five regions or theatres. The reason for China adopting this policy was to develop an integrated joint operations capability, promoting joint training between services which hitherto was found wanting prior to the restructuring. The Western Theatre Command of China encompasses a geographical area larger than the landmass of India.

The US has been a superpower ever since the world wars. Having fought against the Nazi forces and its requirements of maintaining the balance of power during the Cold War era, the need to have a global military presence was inescapable. Technologically advanced with an annual defence budget of $778 billion in 2020, the country remains the undisputed global power. With a change in administration this year, the commitment of Joe Biden towards NATO and other global challenges has only increased. The country will continue to receive bipartisan support for its military spending and defence budget in the coming years.

China aspires to challenge the hegemony of the US and it views its military modernisation as a necessity to achieve the same. With the Chinese Communist Party having supreme control and authority to not only spend money, but also bring about reforms and structural changes in the military dispensation without any opposition, its path to becoming a superpower only becomes easier. The forces that China can bring to bear on India, only through its Western Theatre Command, pose a credible military challenge.

India is probably the only nation in the world which faces two hostile nuclear powers with whom boundary issues remain unresolved even after more than seven decades of its independence. We are the world's largest democracy with 18 per cent of the world's population and just four per cent of the world's GDP. The growing demands of a developing nation make competing demands of 'guns' and 'butter' difficult to fulfill. India's defence budget has not crossed 2.5 per cent of its GDP in the last decade. Increased spending on defence, with the after-effects of the Covid pandemic, is a remote possibility. While we as a nation are unable to commit to increased spending on defence because of our developmental and economic imperatives to alleviate poverty, we cannot afford to be lulled into thinking that 'doing something' will alleviate our security concerns. Moreover, we as a nation, governed by political imperatives, would find it difficult to expect the kind of commitment that the CPC accords to military spending. Neither can we expect the kind of budgetary support that the US gives to its military modernisation. "If it ain't broke, don't fix it," a famous proverb says it all when we talk of reorganisation of theatre commands in the Indian context.

China aspires to challenge the hegemony of the US and it views its military modernisation as a necessity to achieve the same

Every country expects its armed forces to protect its citizens and the nation from external aggression and to assist in humanitarian assistance and disaster relief (HADR) apart from being called upon to help

help in nation- building through military diplomacy and other means. Structural changes, unfortunately, do not lead to changes in mindset and means of waging war. In order to ensure that the proposed changes bring about reform and ensure optimisation of resources, it is necessary to have both a worm's and a bird's eye-view. A bird's eye-view is required to look at the strategic level to where we would like to see ourselves as a nation 15-20 years from now and what resources/alliances that we need to commit to, to ensure it. A worm's eye-view will tell us what is required to achieve synergy. Joint planning is the elephant in the room as far as military operations are concerned. To achieve optimisation of results, joint planning and training is the sine qua non. When we talk of national threats, we need a 'whole of government' approach and it is not very different from the military. There is no denying the fact that the armed forces have to fight together, and for that to happen, the first step is planning together.

Given the available resources and organisational structures, with respect to the threats that we face, it is unlikely that one theatre commander would be able to effectively deal with the same. There is no gainsaying the fact that in any operation, speed is of essence and air assets would be critical to achieving the same. Do we have the luxury of spreading our meagre resources thin into various theatre commands? Have we planned together to achieve this? Have we done enough war-gaming to see how this would pan out in case of a crisis? Let us not fall prey to being seen to be doing something in trying to fix something that doesn't need fixing, while leaving things that need fixing. History would not judge us kindly in the future if we make haste to take decisions without thinking them through logically.

However, many issues related to resources as well as institutional boundaries remained unresolved and bitter infighting broke out between the US Navy and the USAF over aviation "roles and missions

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Why India's military leaders must have a free and frank discussion on demarcation of air power roles and mission

Arun Prakash | 12 August 2021

Additional Director General, Centre for Air Power Studies | 12 August 2021

Source: The Indian Express | https://indianexpress.com/article/opinion/columns/why-indias-military-leaders-must-have-a-free-and-frank-discussion-on-demarcation-of-air-power-roles-and-missions-7447880/

India's Chief of Defence Staff (CDS) could have avoided controversy and the recent inter-service spat had he been a little more selective about phraseology. While the air chief was entitled to take umbrage at the IAF being termed a "support arm," no one could have reasonably objected if the CDS had described "air-power" as performing a support function, since the two are not synonymous.

One felt a sense of déjà vu at the ensuing uproar having witnessed similar scenarios during the proceedings of the 1999 Arun Singh Task Force as well as the 2011 Naresh Chandra committee on defence reforms. This was not the first time that air-power issues have triggered bitter debates that serve to stall and delay the process of defence reform in India — and elsewhere.

Ever since the advent of military aviation, air

power has been the cause of fierce controversies and debates worldwide. While the outcome of strategic bombing in the Second World War remains an issue of disputation, the extensive employment of air power in support of land and maritime operations met with outstanding success. Allied air operations did, however, see multiple instances of inter-service overlap and confusion, and this led the US Congress to enact the National Security Act of 1947, which, apart from unifying the armed forces, created an independent US Air Force.

However, many issues related to resources as well as institutional boundaries remained unresolved and bitter infighting broke out between the US Navy and the USAF over aviation "roles and missions". Given the urgency of addressing these contentious issues, in March 1948, the US Secretary of Defence cloistered himself with the service chiefs, and, together, they hammered out a consensus. This was enshrined in the "US Code of Federal Laws", and remains the legal basis for roles and missions of the US military.

A two-seat Su-57 would be an outlier. There are lots of stealth fighters in service or in development all over the world.

In India, no such discussion has ever taken place and there is no mutually agreed upon or government-mandated demarcation of aviation roles and missions. Periodic "sniping" and even "poaching" has, therefore, taken place, leaving the IAF beset with a deep sense of insecurity, for reasons that I outline.

The 1970s saw an acrimonious debate between the IAF and the Indian Navy (IN) about the discharge of the maritime reconnaissance (MR) role, which the air force had inherited at independence. The penetration in 1971 of our waters by Pakistani submarines, having brought matters to a head, the government decided to hand over the MR role and aircraft to the IN in 1976.

The Indian Army, too, had been demanding the creation of an integral air arm, citing unsatisfactory aviation support by the IAF in forward areas. The issue became another inter-service squabble till the government intervened in 1986 and sanctioned the transfer of assets from the IAF to the newly formed Army Aviation Corps. The controversy did not end here as control of attack helicopters remained an issue of inter-service contention.

The IAF, having seen sister services appropriate its roles and assets, remained wary about jointness. Concepts of CDS and integrated commands which would require air assets being placed under non-IAF control, ring alarm bells in Air HQs. There are misperceptions on both sides of the "air-power divide", and the crying need of the day is for the tri-service leadership to sit around a table and provide mutual reassurance regarding service "roles and missions".

Air power, in the post-Cold War era, acquired a new aura. Based on the lethality and speed of modern air power, it is claimed that once "air dominance" has been achieved, the war is virtually won. In this paradigm, close support of surface forces receives low priority because quick military victories can be won from the air at minimal cost. However, such euphoric assumptions were based on recent conflicts where modern air forces wielding advanced technology had encountered irregular forces.

India, on the other hand, is faced with well-equipped, motivated and competent adversaries. The PAF, although numerically inferior, is a professional peer and has the assurance of Chinese support. The PLA Air Force not only outnumbers the IAF, but has the advantage of an advanced technological base. In our calculus, therefore, we cannot afford to bank on any specific advantage, nor speak nonchalantly about establishing "air dominance" over Pakistan or Tibet.

For too long have we treated the demarcation of air power roles and missions as a "holy cow" and shirked from free and frank discussion. The facade of inter-service bonhomie has concealed a germ of discord which needs to be exorcised. The conundrum that needs to be resolved is posed by the IAF's certainty about the "indivisibility of air power", versus the belief of the army and navy that aviation must be an integral resource, available at their disposal.

Questions that military leaders will need to address, jointly, are: One, should attainment of air dominance be an end in itself, superseding military and maritime strategies? Two, should air power be seen as merely an instrumentality to gain operational objectives on land, sea and air? Three, is there a via-media which will maximise the synergy and combat effectiveness of all three services, perhaps by modifying the IAF's 2012 doctrine?

Three final points need to be made in the closely related context of the joint commands being currently contemplated/constituted. First, it must be ensured that allocation of air power is not made piece-meal, but flows from an integrated, tri-service plan. Second, operational deployment of the command's aviation resources must be managed on behalf of the C-in-C, by his 2/3-star IAF component commander. Finally, the government must clarify that most high-level posts will, eventually, be tenable by officers of all three services. The rationale for integrated commands must, therefore, not be dictated by provision, to each service, of its "quota" of ranks/posts.

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Why Does Russia Want A Two-Seat Stealth Fighter? Because Its Drone Needs Help

David Axe | 10 August 2021

Source: Forbes | https://www.forbes.com/sites/davidaxe/2021/08/10/why-does-russia-want-a-two-seat-stealth-fighter-because-its-drone-needs-help/?sh=63c58766972c.

It's pretty obvious why the Russian air force is keen to develop a two-seat version of its single-seat Su-57 stealth fighter.

In a conflict with the US, such deployments would be problematic. Sheu Jyh-shyang, a researcher at the Institute for National Defense and Security Research, a think-tank funded by Taiwan's defence ministr

The air force plans to pair the Su-57 with the S-70 Okhotnik drone. But the drone lacks autonomy. That means whoever is aboard the Su-57 might also have to steer the S-70, one input at a time.

If that's the case, it'd be really helpful to have a second set of hands and eyes in the manned plane.

"The defense ministry and the Sukhoi Design

Bureau have plans to develop a two-pilot aircraft," Yuri Borisov, Russia's deputy prime minister, announced in June while discussing the Su-57.

Borisov claimed, without explaining why, that a two-seat Su-57 would be attractive on the export market.

But the benefit to the Russian air force is clear. Around the same time as Borisov's announcement, an industry source told state media the plan was for Russia's Su-57s each to control between two and four S-70s.

The drones would add their sensors and weapons to the Su-57's own capabilities.

A two-seat Su-57 would be an outlier. There are lots of stealth fighters in service or in development all over the world. All are single-seat. To fly them, pilots train in simulators and twin-seat training jets.

The ability of air power which was largely seen as an offensive, as a no-no in some situations particularly in the subcontinent...the paradigms have shifted, the scenarios have shifted and we need to keep this in mind as we go ahead

The second crew member in a two-seat Su-57 could devote their attention to controlling drones, freeing up the pilot to fly the jet. The backseater could monitor the drones on radar, send them commands via radio datalink and see what the drones see through the robots' own cameras.

That's not the only way to pair manned and unmanned fighters, of course. The U.S. Air Force is developing its own "wingman" drone, but isn't developing two-seat versions of its F-22 and F-35 stealth fighters.

Instead, the American wingman drone boasts sophisticated artificial intelligence that allows the 'bot to make routine decisions. A human controller would issue broad commands—go here, patrol there, open fire!—while the drone handles navigation.

The U.S. model for manned-unmanned teaming is hands-off. The Russian model is hands-on. While this could reflect doctrinal differences between the U.S. and Russian air forces, it also points to differences in A.I. development.

The USAF has made autonomy the driving factor in its Skyborg wingman-drone program. The airframe by contrast is small, cheap and "attritable"—that is, disposable in combat.

The Russian air force by contrast is focusing on the airframe to the detriment of the A.I. Where the American Skyborg is small (22 feet across) and cheap ($2 million a copy), the Russian S-70 is big (46 feet across) and expensive ($20 million a copy).

The S-70 is not attritable. And it's not on track to be very autonomous in its initial version. "The Okhotnik will be a remote-controlled vehicle initially," said Samuel Bendett, an analyst with the Center for a New American Security in Washington, D.C. and the Center for Naval Analysis in Virginia.

Which country is pursuing the best strategy for manned-unmanned teaming is hard to predict until wingman drones fly their first combat missions.

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China's focus on giant aircraft carriers makes it vulnerable to missile threat

Kathrin Hil | 11 August 2021

Source: Financial Times | https://www.ft.com/content/61b31702-8425-4beb-8c1b-b05205f8402f.

When Chinese naval commander Admiral Liu Huaqing discussed the need for aircraft carriers in 1986, he argued that Beijing should acquire them for "safeguarding the country's maritime interests, including the recovery of the Nansha [Spratly Islands] and the reunification of Taiwan".

Thirty-five years later, the People's Liberation Army Navy seems on a fast track to make Liu's dream come true. China has two aircraft carriers in operation, and as satellite images show, a third is nearing completion in a Shanghai shipyard.

Indian fighter jets bombed Jaish-e-Mohammed's biggest training camp near Balakot deep inside Pakistan on February 26, 2019, 12 days after the terror outfit claimed responsibility for a suicide attack on a CRPF convoy in Kashmir, killing 40 soldiers.

The newest carrier, which could be in the water as early as this year, is the first that China has designed and built on its own. It will also be the first such ship that comes close to matching the US's supercarriers: At 318m length, it is only 14 metres shorter than the US's most advanced Ford class carrier. Like the Ford class, it is expected to feature electromagnetically powered catapults for launching fighters.

But military experts posit that Beijing's pursuit of a naval force centred on such massive ships makes it vulnerable to the same threat China is mounting against the US Navy in Asia: missiles that can hit moving aircraft carriers or the large bases they need, making it dangerous for them to access or freely move around in certain waters.

"There is no doubt in my mind that China will end up with at least six carriers," said Bernard Cole, a retired US naval officer and author of an authoritative book on the PLAN. "That doesn't bother me, since I am convinced carriers are outmoded, best described as large submarine targets. I think a better way to put air power at sea is with unmanned drones."

Over the past decade, China has started undermining the US's maritime hegemony in the region with anti-access, area denial (A2/AD) weapons, including the Dongfeng-21D, the anti-ship ballistic missile nicknamed the "carrier killer".

As Washington — which has 11 carriers — is adjusting its global military posture from an emphasis on fighting insurgencies in the Middle East to a focus on China, US experts argue that it can, together with allies in Asia, use A2/AD against China as well.

The Center for Strategic and Budgetary Assessments advised in a study that the US should use land-based precision strike networks and allies' assets to "menace the Straits that Chinese merchant and war ships must transit to exit the East and South China Seas."

The shallow seas off China's coast are ringed in by a chain of large islands including Japan, Taiwan and the Philippines — all three allies or partners of the US. No matter if Chinese naval vessels pass through the Miyako Strait between Japan's Okinawa island and Taiwan, or the Bashi Channel between

Taiwan and the Philippine island of Luzon, they are within the range of ground-based missiles.

"The US itself may not do so much in terms of counter-A2/AD against China naval assets, but it will ask its allies to step up efforts to do so," said Lin Ying-yu, an expert on the PLA at National Chung Cheng University in Taiwan.

The threat is unlikely to prevent China from deploying its fledgling carrier force.

"The PLA Navy…will continue to deploy, day in and day out, surface warships that provide the nation capabilities in diplomacy, peacetime presence, sea-lane protection, crisis response and, in its near seas, deterrence," wrote retired Rear Admiral Michael McDevitt, a former US naval commander, in a recent book on the Chinese navy.

Russian soldiers will reportedly be using Chinese weapons. It is the first joint drill China has been involved in since the coronavirus outbreak

In a textbook example recently, one of China's two operational carriers manoeuvred in the South China Sea while the HMS Queen Elizabeth was sailing through, in a warning to the UK's newest carrier not to come too close to territory claimed by China.

But as Beijing's economic interests grow around the globe, it may need to deploy carriers farther and farther from its shores. McDevitt argued that anti-piracy missions in the Gulf of Aden, where PLAN ships would operate alone in waters where the airspace is dominated by the US or India, reinforced for Beijing the importance of air cover for distant operations that could involve combat.

In a conflict with the US, such deployments would be problematic. Sheu Jyh-shyang, a researcher at the Institute for National Defense and Security Research, a think-tank funded by Taiwan's defence ministry, said: "The carrier fleet they are building now can't reach the Pacific without coming into the range of missiles from US allies."

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Air Power

IAF focused on boosting capabilities after Balakot strikes, Galwan Valley clashes

10 August 2021

Source: The Hindu | https://www.thehindu.com/news/national/iaf-focused-on-boosting-capabilities-after-balakot-strikes-galwan-valley-clashes-iaf-chief/article35837643.ece

India's air power capabilities in terms of hitting targets with precision, defending assets and use of new technologies have gone up significantly after the Balakot air strikes and rapid developments in eastern Ladakh following the Galwan Valley clashes, Chief of Air Staff Air Chief Marshal R.K.S. Bhadauria said on Tuesday.

In an address at a leading think-tank, the IAF Chief said India now has an "edge" in its ability on both the Western and Northern fronts to "react fast, respond fast and hit fast", noting that induction of Rafale jets has helped in bringing the "next level" of operational transformation.

About the drone strike on the Jammu airbase, he said the IAF is taking a series of initiatives including procuring next-generation jammers to deal with such challenges and added that the attack

would not have been possible if it was attempted two-three months later

Referring to the 11-day conflict between Israel and Hamas in May, Air Chief Marshal Bhadauria said that Israel's use of air power in carrying out operations with surgical precision to achieve its objectives in Gaza against the militant group while ensuring minimum collateral damage was a reflection of the ability of the air assets.

Explaining the role of air power, the IAF Chief also talked about the general perception to look at only its offensive role and the general tendency to say "no-no" for its use in certain situations, saying the paradigms and scenarios have shifted and there is a need to keep this in mind.

The air force hailed the drill: "This historic cooperation between the IAF and AFCENT is another example of the long-standing alliance and strategic cooperation between Israel and the United States.

"The ability of air power which was largely seen as an offensive, as a no-no in some situations particularly in the subcontinent...the paradigms have shifted, the scenarios have shifted and we need to keep this in mind as we go ahead," he said at the United Service Institution of India (USI).

At a seminar last month, Chief of Defence Staff Gen Bipin Rawat, while referring to the proposed integrated theatre commands, described the Air Force as a "support arm" but Air Chief Marshal Mr. Bhadauria disagreed with him, saying airpower has a huge role to play.

About the IAF's operational readiness, he said the focus was to bring in the next level of operational transformation including in the cyber-security domain after the Galwan Valley clashes and his force has been largely successful in its endeavour.

Air Chief Marshal Mr. Bhadauria said the "edge" that the IAF has today came from a combination of its weapons, training status, platforms network environment and its ability to "react fast, respond fast and hit fast.

"That is the edge we have today in both scenarios, be it on the western front or be it on the northern front," he said.

He said the "transformation" was triggered by the developments like Balakot strikes and situation in eastern Ladakh and it now has now taken the IAF to the "next level.

The IAF Chief said the induction of the Rafale aircraft has helped in lifting the overall offensive capability of the Air Force. "It is a level or a level-and-a-half above where we were." He said the focus after the Galwan Valley clashes was to bolster the cyber security system as it was identified as an area of concern mainly because of some of the "actions", he said in an apparent reference to the ability of the adversary to the IAF's networks.

He said the IAF's operational offensive capability has gone up in terms of having long-distance air-to-ground weapons, in carrying out precision strikes and possessing network-centric environment.

Twenty Indian Army personnel laid down their lives in clashes with Chinese troops on June 15 last year that marked the most serious military conflicts between the two sides in decades.

In February, China officially acknowledged that

five Chinese military officers and soldiers were killed in the clashes though it is widely believed that the death toll was higher.

The Chief of Air Staff also mentioned Balakot air strikes as an important event while talking about the transformation of the IAF in the last few years, and said it sent out a clear message about India's approach in dealing with security challenges.

Indian fighter jets bombed Jaish-e-Mohammed's biggest training camp near Balakot deep inside Pakistan on February 26, 2019, 12 days after the terror outfit claimed responsibility for a suicide attack on a CRPF convoy in Kashmir, killing 40 soldiers.

Pakistan retaliated by attempting to target Indian military installations the next day. However, the IAF thwarted their plans.

The Defense Ministry has released monthly scramble tallies since April 2020. The 35 in June was the most for a single month, and exceeded the 23 against Chinese aircraft in the same month.

Air Chief Marshal Mr. Bhadauria also spoke about the low cost activities of commercial drones and its use for supply of arms, drugs, money as well as use of the armed version of the unmanned aerial vehicles to launch an attack on the Jammu airbase.

He referred to China's emergence at the world stage, its diplomacy, economic clout and military belligerence in Indo-Pacific.

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Russian Air Force to get over 60 new aircraft by year-end

11 August 2021

Source: RUSSIAN NEWS AGENCY | https://tass.com/defense/1324635

MOSCOW, August 11. /TASS/. More than 60 new and over 200 modernized aircraft will be delivered to Russia's air force by the end of the year, Deputy Commander-in-Chief of Russia's Aerospace Forces Lt. Gen. Sergei Dronov said in an interview with the Krasnaya Zvezda newspaper.

"By the end of the year, the delivery of over 60 new aviation products is scheduled, including advanced multirole Su-30SM, Su-35S, Su-57 aircraft and Su-34 medium-range fighter-bombers, heavy Il-76MD90A military transport planes, Mi-28NM and Ka-52 combat helicopters and Mi-8AMTSh-VN special operations helicopters," Dronov said.

He added that the Russian air force will also receive over 200 modernized aircraft.

All equipment is tested in combat conditions in the Syrian Arab Republic, and adjustments are made if necessary, the official said.

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China, Russia conduct joint military drills with J-20 fighters, missiles and drones

11 August 2021

Source: WION Web Team | https://www.wionews.com/world/china-russia-conduct-joint-military-drills-with-j-20-fighters-missiles-and-drones-404552

Russia and China launched the biggest joint military exercise in China's north-central Ningxia region on Monday involving 10,000 ground troops

and Air Forces of the two countries.

Russia's Su-30SM fighter aircraft will be part of the Sibu/Cooperation-2021 military exercise.

China's state-run Xinhua news agency quoting Chinese and Russian officials said the drills were to "deepen joint anti-terrorism operations and demonstrate the firm determination and strength of the two countries to jointly safeguard international and regional security and stability."

Russian soldiers will reportedly be using Chinese weapons. It is the first joint drill China has been involved in since the coronavirus outbreak.

According to the China's Global Times, the country's Air Force has dispatched J-20 stealth fighter jets and Y-20 large transport planes for the drill which is taking place in the northwestern region.

Japanese Ministry of Defense announced the plan on August 7 as part of what the newspaper described as Tokyo's "rush to develop capabilities to counter the development of hypersonic weapons.

The drill also includes howitzers, armoured vehicles, surface-to-air missiles, drones and rocket launchers, Global Times said.

The opening ceremony reportedly involved China's J-11 fighter jets, J-16 multirole fighter jets, JH-7A fighter bombers and H-6K bombers. The drills are set to conclude on Friday.

Ningxia region is strategically located along the Xinjiang border where Chinese officials have been accused of carrying out human rights violations against ethnic Uighurs in internment camps.

Russia also carried out joint drills with Tajikistan with Uzbekistan forces on Tuesday along the Afghan border amid the Taliban advance in the country with the Putin regime reinforcing its military base in Tajikistan.

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Israeli, US air forces complete first-of-a-kind joint drill in southern Israel

Emanuel Fabian | 10 August 2021

Source: The Times of Israel | https://www.timesofisrael.com/israeli-us-air-forces-complete-first-of-a-kind-joint-drill-in-southern-israel//

The Israeli military announced on Tuesday that it had completed a first-of-a-kind aerial exercise with the United States Air Force Central Command, simulating various operational scenarios in Israel's skies.

During the drill, dubbed "Desert Eagle," the Israeli Air Force's 133rd Squadron trained alongside the US Air Force's 494th Squadron at the Ovda airbase in southern Israel, according to the Israel Defense Forces.

IAF 115th Squadron fighter jets simulated enemy forces in the drill, it added.

"The aircrews practiced various operational scenarios in the air, including joint exercises against ground, aerial and combined threats while striking designated targets," the military said in a statement.

The air force hailed the drill: "This historic cooperation between the IAF and AFCENT is another example of the long-standing alliance and strategic cooperation between Israel and the United

States."

In January, the US Department of Defense announced that Israel, which had been under the area of responsibility of the US military's European Command (EUCOM), was being moved to the Central Command, which operates in the Middle East.

The move is meant to improve the cooperation between Israel and other countries in the region in confronting the threat posed by Iran.

In recent weeks the region saw a series of escalations, including an explosive-laden drone attack on an Israeli-linked ship off the coast of Oman that killed two crew members. The attack has been blamed on Tehran by Israel and Western nations.

The Jewish state had historically been kept out of CENTCOM out of concern that it could cause friction between the US and the other countries in the region, most of whom held a negative view of Israel. This is no longer true of some countries in the Middle East, particularly those in the Persian Gulf.

The maneuverability and low flight altitude of hypersonic weapons could challenge existing detection and defense systems

Despite January's announcement and the recent drill, Israel has not yet formally been transferred to CENTCOM's area of responsibility.

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ASDF scrambles against Russian aircraft spike suddenly

10 August 2021

Source: The Asathi Shimbun | https://www.asahi.com/ajw/articles/14407118

Scrambles by Air Self-Defense Force jets against Russian aircraft in June exceeded those against China for the first time in nine months, apparently due to military exercises staged by Russia and political maneuvering by that country's prime minister.

ASDF jets scrambled on 35 occasions against Russian aircraft in June.

China in recent years has traditionally been the target for most scrambles because of its maritime advances in the region, which invariably involve Chinese aircraft flying in combination with its naval vessels.

But military exercises by Russia in the vicinity of the disputed Northern Territories, as well as a recent visit by the Russian prime minister to the islands off Japan's northernmost main island of Hokkaido, appear to explain the sudden spike in scrambles against Russian aircraft.

The Defense Ministry has released monthly scramble tallies since April 2020. The 35 in June was the most for a single month, and exceeded the 23 against Chinese aircraft in the same month.

Russia announced June 23 it would hold military exercises in the vicinity of the Northern Territories involving about 10,000 military personnel.

On June 25, a Russian Su-25 fighter jet was spotted approaching the Japanese air defense identification zone above the Sea of Japan north of Hokkaido. That led to a scramble of ASDF jets.

Scrambles are normally directed against

surveillance and intelligence-gathering aircraft, and this was the first time ASDF jets took to the air to eyeball an Su-25. The fighter jet may have been flying back to Russia after completing its military exercise.

In late July, Russian officials notified their Japanese counterparts that firing exercises would be conducted intermittently in waters near Kunashiri island, one of the four making up the Northern Territories, until the end of August.

18 GSLV launches since 2001, (including GSLV Mk-III), this could be considered the fourth unsuccessful mission. According to the ISRO, the three unsuccessful missions of the GSLV were on July 10, 2006, April 15, 2010 and December 25, 2010.

Using diplomatic channels, Japan issued a protest.

"Japan cannot accept it because it represents a strengthening of the Russian military capability in the four islands off Hokkaido," Chief Cabinet Secretary Katsunobu Kato said.

But such concerns seemed to have fallen on deaf ears in Moscow as Russian Prime Minister Mikhail Mishustin visited the Northern Territories on July 26.

It was the first visit to the islands by a Russian prime minister in two years.

One of the main objectives for Mishustin was to step up joint economic cooperation on the Northern Territories between Japan and Russia. He said the Russian government would consider tariff and tax exemptions for companies that decide to set up operations on the islands.

Foreign Minister Toshimitsu Motegi issued a statement of protest that said the visit would not contribute to improving bilateral relations.

A high-ranking Foreign Ministry official speculated that the military exercises and visit by the prime minister may be attempts by Russia to get a feel for where Tokyo stands on the issues.

But a high-ranking Defense Ministry official suggested Russian parliamentary elections scheduled for September may have been a factor, saying the recent moves show the Russian public that the Putin administration is doing everything it can to protect the Northern Territories, which Soviet forces seized from Japan in the closing days of World War II.

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Japan Wants to Detect Incoming Hypersonic Missiles With Unmanned Aircraft

Thomas Newdic | 09 August 2021

Source: The Drive | https://www.thedrive.com/the-war-zone/41909/japan-wants-to-detect-incoming-hypersonic-missiles-with-unmanned-aircraft

The Japanese Ministry of Defense is considering using unmanned aerial vehicles equipped with infrared sensors to provide early warning of potential attacks on the country by hypersonic missiles. Recent reports from the country indicate that the drone-based detection system has been proposed as one response to high-speed weapons developments in China and Russia and specifically to counter a new class of ballistic missiles carrying hypersonic glide vehicles.

According to a story on the website of the Sankei Shinbun daily, the Japanese Ministry of Defense announced the plan on August 7 as part of what the newspaper described as Tokyo's "rush to develop capabilities to counter the development of hypersonic weapons."

The same report notes that the unmanned aerial vehicles would be equipped with an undisclosed but existing infrared detection system originally designed to identify ballistic missile attacks, "technology verification" of which was apparently completed in 2019. The "small infrared sensor" would be carried aloft by a drone that would "operate in an airspace closer to the enemy" and which would be able to remain aloft for long periods.

#Japan #HypersonicMissile

Japan accidentally leaks images of prospective Hypersonic Missile. According to a local source, this is a new hypersonic anti-ship missile developing by Acquisition, Technology & Logistics Agency (ATLA)

sourcehttps://t.co/8NSKRXofqs pic. twitter.com/PUzNshUYaI

— Tony (@Cyberspec1) July 10, 2020

The problem of detecting a hypersonic missile attack early enough to respond with any chance of success is one of increasing urgency, as more countries embark on the development of this class of weapon.

Traveling at speeds of Mach 5 or above, hypersonic weapons fly at velocities broadly similar to ballistic missiles, but unlike them, they do not follow a predictable ballistic trajectory and are able to maneuver as they head toward their target, making them harder both to detect and to defeat by kinetic means.

"The maneuverability and low flight altitude of hypersonic weapons could challenge existing detection and defense systems," a Congressional Research Service report on hypersonic missile defense stated in June this year. "For example, most terrestrial-based radars cannot detect hypersonic weapons until late in the weapon's flight due to line-of-sight limitations of radar detection. This leaves minimal time for a defender to launch interceptors that could neutralize an inbound weapon."

The Japanese drone-based detection system would involve "multiple" UAVs continuously monitoring the airspace and transmitting their collected data to ground stations.

The type of drone, or drones, envisaged for this surveillance mission are not specified, but unmanned aircraft is an area that the Japanese military is increasingly investing in, after an admittedly slow start.

The Japan Air Self-Defense Force, for example, has ordered three RQ-4B Global Hawk Block 30 high-altitude surveillance drones, the first of which took to the air in Palmdale, California, in April this year. Able to fly at an altitude of up to 60,000ft and conduct sorties lasting more than 32 hours, the RQ-4 would be a suitable candidate for hypersonic missile detection, but a fleet of three vehicles would likely struggle to provide the degree of coverage required.

Meanwhile, in the United States, the Missile Defense Agency (MDA) has been working on UAVs intended to detect hostile ballistic missiles, which could include those carrying boost-glide vehicles. The agency has conducted airborne sensor tests

using specially configured MQ-9 drones, equipped with infrared tracking sensors and lasers, and precision tracking and discrimination algorithms. In one MDA trial, which took place off Hawaii in 2016, a pair of MQ-9s detected and tracked a ballistic missile target during a test in the Pacific.

In all likelihood, this kind of ability to detect and track high-speed threats and triangulate them is a similar model to what Japan is now envisaging. However, using two drones, at least, is a prerequisite of this type of scenario, in order to combine data from their sensors to create a stereo track and geolocate the threat. At the same time, two aircraft or more geographically separated drones would have to be airborne at all times to ensure coverage. Nevertheless, there is clearly potential for Japan to leverage at least some of this research and capability with the help of the United States, to help meet its own emerging requirements.

HVGP is a hypersonic cruise missile (HCM), which will be powered by a scramjet engine and appears similar to a typical missile

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Space Power

GSLV-F10 fails to launch earth observation satellite into intended orbit

12 August 2021

Source: The Hindu | https://www.thehindu.com/news/national/gslv-f10-fails-to-launch-earth-observation-satellite-into-intended-orbit/article35868987.ece

A technical anomaly preventing the ignition of the GSLV-F10 rocket's cryogenic upper stage spelt disappointment for Indian Space Research Organisation (ISRO) on Thursday morning, as the national space agency could not accomplish the mission to launch earth observation satellite EOS-03 into the intended orbit.

Though the lift-off at the scheduled time of 5.43 a.m. from the second launch pad in the Satish Dhawan Space Centre at Sriharikota, some 100 km from here, was successful, the anomaly was realised only after a few minutes. "The performance of the first and second stages was normal. However, cryogenic upper stage ignition did not happen due to a technical anomaly. The mission couldn't be accomplished as intended," the ISRO said in a statement. It did not elaborate any further.

EOS-03, intended to be positioned in the geostationary transfer orbit initially, was supposed to reach the final geostationary orbit. It was expected to provide near real-time imaging of a large area of interest at frequent intervals, which could be used for quick monitoring of natural disasters, episodic events and any short-term events. The mission life of the satellite was 10 years.

Soon after the 51.70 metre-tall GSLV-F10's went up, a live telecast on Doordarshan showed scientists in the Mission Control Centre (MCC) eagerly waiting and hoping for its smooth and successful functioning.

Sense of uncertainty

The launch resembled a routine affair until the rocket's second stage, some five minutes after the lift-off. A sense of suspicion and uncertainty descended

upon the MCC as the graph on the screens showed a slight deviation of the rocket's path.

A few minutes later, some ISRO officials were seen discussing with ISRO chairman K. Sivan. After a few rounds of discussions, the Range Operations Director announced: "Performance anomaly [was] observed in the cryogenic stage. [The] mission could not be accomplished fully."

Mr. Sivan too made a formal announcement that the mission could not be accomplished, "mainly because it is a technical anomaly observed in the cryogenic stage."

GSLV-F10 was ISRO's eighth flight with indigenous cryo, 14th GSLV flight and 79th launch from Sriharikota. A 4-metre diameter Ogive-shaped payload fairing was flown for the first time in this GSLV flight.

Of the 18 GSLV launches since 2001, (including GSLV Mk-III), this could be considered the fourth unsuccessful mission. According to the ISRO, the three unsuccessful missions of the GSLV were on July 10, 2006, April 15, 2010 and December 25, 2010.

HVGP is a hypersonic cruise missile (HCM), which will be powered by a scramjet engine and appears similar to a typical missile

While the first stage of the GSLV is solid fuel, the second is liquid fuel and the third the cryogenic engine.

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ISRO-SAC instrument finds presence of hydroxyl and water molecules on Moon

Sohini Ghosh | 10 August 2021

Source: The Indian Express | https://indianexpress.com/article/india/isro-sac-instrument-finds-presence-of-hydroxyl-and-water-molecules-on-moon-7448012/

In what can be called a pathbreaking discovery, the Indian Space Research Organisation's (ISRO) homegrown instrument aboard Chandrayaan-2 has detected the unambiguous presence of hydroxyl and water molecules on the Moon with the precision of differentiating between the two. The findings also strongly suggests that the presence of these correlates with mineralogy and latitudinal location, according to a paper published in the latest issue of fortnightly journal Current Science.

Imaging infrared spectrometer (IIRS), an imaging instrument that collects information from the electromagnetic spectrum for understanding the mineral composition of the lunar surface with each element possessing a 'spectral signature' unique to itself, was developed by Ahmedabad-based unit of Space Applications Centre (SAC) of ISRO.

Capable of operating in the wavelength of 0.8 to 5 micrometre, the relatively broader range within which the indigenous instrument for water detection can image, is a first for IIRS capabilities on India's second moon mission.

The discovery is being hailed as critical for future planetary exploration and resource utilisation.

While the first Moon mission of Chandrayaan-1 in 2008 carried a similar instrument called Moon Mineralogy Mapper (commonly known as M3) capable of detecting water, the range of detection

was lower — between 0.4 to 3 micrometre — and was also developed by NASA's Jet Propulsion Laboratory and was not indigenous to ISRO. The higher wavelength range of IIRS permits for better accuracy in results. In September 2009, results published of the M3 instrument data had shown detection of absorption features on the polar regions of the surface of the moon "usually linked to hydroxyl- and/ or water-bearing molecules," as NASA states. A 2017 research article by researchers from the Brown University had noted, "…the wavelength range of M3 is too limited to accurately determine the full shape and maximum absorption point within the 3-µm (micrometre) region, making it difficult to differentiate OH (hydroxyl) from H2O (water), particularly if both species are present." Notably, the human eye is capable of detecting wavelengths in the range of 0.3 and 0.7 micrometre.

The introduction of longer-range gliding missiles to protect the Nansei Islands (Ryukyu Islands) would make it possible for Japan to respond to China's activities without deploying the Maritime Self-Defense Force's vessels and aircraft

Prakash Chauhan, director at IIRS Dehradun, in response to queries by The Indian Express said in a written statement that since the spectral coverage of M3 instrument was limited upto 3 micrometre, distinction between hydroxyl, water and water ice/ frost was not possible.

"Remote detection of water and/or hydroxyl signatures on the lunar surface is of significant importance as it provides clues to understand the various sources and water production mechanisms. Accurate detection of water and hydroxyl on the Moon in the three micrometre wave band region requires a thermal correction to reflected sunlight from Moon due to high daytime temperature… which contributes an additional thermal signal in the reflectance spectra…," the statement said.

As more data from the mission is made available in the future, the scientists are hoping that they will be able to learn more about hydroxyl and water production and hydration processes on the moon.

As per a research article in the August issue of Current Science, three strips on the Moon's surface were analysed by IIRS sensor for hydration presence and as reported, the initial analysis "demonstrates the presence of widespread lunar hydration and unambiguous detection of OH (hydroxyl) and H2O (water) signatures on the Moon." It was also observed from the data that the brighter sunlit highland regions at higher latitides of the Moon were found to have higher hydroxyl or possibly water molecules, that is enhanced hydration, compared to the large basaltic plain regions where hydroxyl appeared to be dominant, especially at higher surface temperature.

As the paper authored by scientists from Indian Institute of Remote Sensing (IIRS) in Dehradun, SAC in Ahmedabad, UR Rao Satellite Centre in Bengaluru and ISRO headquarters in Bengaluru note, the most common and widespread process for the formation of hydroxyl and water on the Moon is considered to be due to interaction of solar winds with the lunar surface, a process termed as 'space weathering'. Space weathering along with the impact from small meteorites often lead to chemical changes on the surface of the moon

ultimately leading to formation of either the volatile and reactive hydroxyl molecules or the more stable form of water molecules.

On the future scope of this initial analysis the paper concludes, "The proper interpretation of hydration feature through spectral analysis is significant as it provides important inputs regarding geology and geophysics of the mantle (of the moon) in terms of their mineralogy, chemical composition, rheology and solar–wind interaction. This is also significant for future planetary exploration for resource utilization."

Four lead authors of the paper — Prakash Chauhan, Mamta Chauhan, Prabhakar Verma and Supriya Sharma — from IIRS Dehradun, seven other authors of SAC — Satadru Bhattacharya, Aditya Kumar Dagar, Amitabh, Abhishek N. Patil, Ajay Kumar Parashar, Ankush Kumar, Nilesh Desai, Ritu Karidhal of URRSC Bengaluru and AS Kiran Kumar from ISRO headquarter in Bengaluru were involved in the latest findings.

This issue was raised before the president of Russia so that the S-400s can be delivered to the Republic of Belarus at a reasonable price on a loan because we do not have such money

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As US Falls Behind, Russia Moves Ahead With Another Hypersonic Missile That Can Hit Targets Deep In The Outerspace

Apoorva Jain| 09 August 2021

Source: The EuroAsia Times | https://eurasiantimes.com/as-us-falls-behind-russia-moves-ahead-with-another-hypersonic-missile-that-can-hit-targets-deep-in-the-outerspace/

According to the latest reports, Russia and Japan are working on two deadly hypersonic weapons called, Kh-95 and HVGP, respectively.

Russian military believes that the dominance in airspace and outer space is necessary to successfully conduct combat activities.

Interestingly, the US Air Force last week acknowledged its second consecutive failure in the flight test of a hypersonic missile called AGM-183A Air-launched Rapid Response Weapon (ARRW).

Earlier, Russia had successfully deployed the Avangard surface-to-surface hypersonic missile. Now, the country is developing a new hypersonic air-launched cruise missile.

Similarly, Japan is on course to launch its first hypersonic cruise missile, amid increasing threats from China's military modernization.

Prior to that, China claimed to have successfully tested the DF-17, a road-mobile medium-range ballistic missile (MRBM) designed to launch a hypersonic glide vehicle (HGV).

Russia's New Missile

Colonel-General Vladimir Zarudnitsky, Chief of the Military Academy of the Russian General Staff, reportedly spilled the beans over the unannounced missile, called Kh-95 or the X-95 in the latest edition of the Russian journal Military Thought.

Identifying the significance of "supremacy in the aerospace" for combat operations, Zarudnitsky noted how Russia has developed hypersonic missiles and weapon systems.

"For this purpose, Russia is developing and accepting such advanced and upgraded armaments, military and special hardware for service in its Aerospace Force as the Tu-160M strategic missile-carrying bomber, the Kinzhal airborne hypersonic missile system and long-range air-launched precision weapons, in particular, the Kh-95 hypersonic missile," Zarudnitsky wrote.

Later, Russian news agencies like RIA Novosti and TASS confirmed the existence of the missile with Novosti reporting that the Kh-95 will be compatible with the Tu-23M, Tu-160M, and Russia's upcoming PAK-DA bomber.

Mikhail Khodarenok, the military observer for Gazeta.Ru, a Russian newspaper, explained that despite the Russian combat aircraft reaching a range over 2000 km where they can launch air-launched cruise missiles (ALCM) before a possible interception by enemy fighter aircraft, an inherent disadvantage — subsonic flight speed — can disrupt the entire combat mission.

"The creation of such products [Kh-95 type] for equipping domestic long-range aviation seems to be a very timely and important task," Khodarenok said.

"ALCM with a long firing range and hypersonic flight speed reduces the capabilities of modern air defense systems to almost zero," he added.

Russia already has three hypersonic weapons — the Avangard, the Kinzhal, and the Zircon.

Last month, the Russian Admiral Gorshkov frigate had successfully test-fired the Tsirkon (Zircon) hypersonic missile against a surface target at a range of over 350 km and the flight speed reached 7 Mach, the Russian Defense Ministry was quoted as saying by RIA Novosti.

In June, reports emerged that two MiG-31 K fighter jets capable of carrying Kinzhal hypersonic missiles have been deployed in the Khmeimim airbase in Syria.

Among other contenders in a race to harness hypersonic technology is Japan, eyeing to deter a militarily superior China. Several media outlets have reported that the Japanese military is developing a hypersonic anti-ship missile capable of destroying the Chinese aircraft carriers.

Known as hypervelocity gliding projectile or HVGP, the project was revealed last year on the Acquisition, Technology and Logistics Agency's website, in which the government outlined its plan to develop homegrown hypersonic weapon systems.

A part of the HVGP is a hypersonic cruise missile (HCM), which will be powered by a scramjet engine and appears similar to a typical missile but one that is capable of much higher speed while covering long distances.

The HVGP, on the other hand, will feature a solid-fuel rocket engine that will boost its warhead payload to a high altitude before separation, where it will then glide to its target using its altitude to maintain high velocity until impact, Defense News reported.

Explaining the functional role of the hypersonic weapon, Naval News reported that the HVGP will be launched from a mobile ground launcher.

"Once it reaches a certain altitude, the glider

separates from the booster and then glides at high altitudes at supersonic speeds while being guided by both satellites and inertial navigation system (INS). It then flies to the target point. The target is attacked from directly above at a 90° dive".

A local newspaper, The Mainichi, published a report revealing more details of the projects.

"The Defense Ministry allocated a total of 18.5 billion yen [$170 million] in the fiscal 2018 and 2019 budgets for research on HVGPs for the defense of remote islands, and plans to add another 25 billion yen [$230 million] in the fiscal 2020 budget," the report said.

The development of the HVGP is planned in two stages. The first stage is expected to be ready by 2026 while the second stage will cruise through 2028 and beyond.

"The 2026 model is for targeting a potential enemy invading Japan's remote islands," the report said.

In the second stage (after 2016), an upgraded type will be developed for possible installation in fiscal 2028 or later, featuring claw-shaped payloads, enhanced speeds and firing ranges and more complex trajectories, it said.

Another enhancement after 2026 could add a "payload that is capable of penetrating the deck of aircraft carriers".

Calling out China's aggressive policy and actions in the contested waters of the South China Sea, the report noted how the Chinese vessels have been spotted navigating in contiguous zones near the Senkaku Islands and intruding into Japanese territorial waters.

Senkaku islands, called Diaoyu Islands by the Chinese, remain a point of contention between China and Japan, both claiming sovereignty over the territory.

"The introduction of longer-range gliding missiles to protect the Nansei Islands (Ryukyu Islands) would make it possible for Japan to respond to China's activities without deploying the Maritime Self-Defense Force's vessels and aircraft," the report noted.

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India, France to launch Space Security Dialogue to protect space asset

Sidhant Sibal | 08 August 2021

Source: WION | https://www.wionews.com/india-news/india-france-to-launch-space-security-dialogue-to-protect-space-asset-403972 & https://zeenews.india.com/india/india-france-to-launch-space-security-dialogue-to-protect-space-assets-2382919.html

India and France are soon set to launch Space Security Dialogue at the heart of which is protecting space assets like satellites.The idea was discussed during French foreign minister Jean-Yves Le Drian's India visit in April and the visit of the head of France's newly created Space Command Michel Friedling in March.

Friedling had visited India just a week after Aster X. Aster X was space military exercises conducted by France which was the first-ever in Europe. American and Germany also took part in

the exercise. The space dialogue is the first France is establishing with any country in Asia.

The development comes even as space is seen as the next frontier of militarisation. In 2019, 2000 satellites were in space, key for communication and other purposes. The US has its space force and several countries like India, Russia, China have anti-satellite weapons.

Space cooperation has been part of the conversation between the two countries. During the visit of French President Emmanuel Macron to India in 2018, "India-France Joint Vision for Space Cooperation" was issued. During the April visit of foreign minister Jean-Yves Le Drian, he went to the ISRO office in Bengaluru and an agreement was signed on cooperation in India's first human space mission - Gaganyaan.

The LINUSS cubesats were developed in collaboration with Tyvak Nano-Satellite Systems, a Terran Orbital Company in which Lockheed Martin made a strategic investment.

Both India, France have a rich history of cooperation in the field of space since the 1960s with the construction of Sriharikota launch-pad with French technical assistance.

India's ISRO and the French Space Agency, CNES have been carrying on various joint research programs and collaborating in satellite launches and joint fleets of satellites for climate sciences.

As part of the ongoing bilateral cooperation between ISRO and Arianespace, GSAT-11 was launched from Kourou (French Guyana) in December 2018, GSAT-30 was launched in January 2020. France has been a major supplier of components and equipment for the Indian space program.

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Global Aerospace Industry

Antonov seeking Canadian support to modernise An-74TK-200

David Kaminski-Morrow | 10 August 2021

Source: Flight Golbal | https://www.flightglobal.com/aerospace/antonov-seeking-canadian-support-to-modernise-an-74tk-200/145012.article

Antonov is hoping to reach an agreement with Canadian authorities on development of a extensively-modernised version of the An-74TK-200 airlifter for North American and other international markets.

The Ukrainian airframer says it has held a series of discussions with Canadian representatives on creating the new aircraft.

It envisions the development as a joint project with a Canadian industrial contribution and is supporting a detailed study to establish technical requirements.

The basic An-74TK-200 is able to transport 52 passengers, or serve as a freighter capable of carrying 1.8t over a range of 2,300nm or up to 10t over 510nm. It has been designed for harsh conditions, including those in the Arctic, and to operate in remote areas with limited runway availability and weak infrastructure.

Antonov says it has submitted proposals to aerospace and defence association Ukroboronprom as well as the strategic industries ministry, ahead of the signing of a memorandum

of understanding on broader aerospace, security, and defence co-operation with the Canadian Commercial Corporation in June.

The Canadian Commercial Corporation assists Canadian suppliers with exporting to foreign governments.

Ukroboronprom points out that the aircraft has been unable to meet market demand because a significant number of components are manufactured in Russia, and claims this has hampered certification in Europe and North America.

It states that the proposed modernised aircraft would feature a 'glass cockpit' instrument panel and introduction of other advanced technologies. The ability to serially produce the twinjet type, it says, has previously been demonstrated by Ukrainian manufacturers.

If you assess what is the fighter squadron requirement of Indian Air Force, they are operating well below that.

Final assembly would be undertaken by production facilities in Ukraine and Canada, the association says. Certification and production of the aircraft, it adds, would assist the Ukrainian aerospace industry in emerging from a "long crisis".

Antonov says a formal implementation of the An-74TK-200 project would require an intergovernmental agreement between Ukraine and the Canadian province of Quebec.

Canadian independent government relations firm Capital Hill Group has been working to obtain political support to continue negotiations over the project.

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Belarus interested in deliveries of Russian S-400 air defense systems, says Lukashenko

09 August 2021

Source: Russian News Agency | https://tass.com/defense/1324125

MINSK, August 9. /TASS/. Belarus is interested in deliveries of the Russian-made S-400 medium-to-long-range air defense missile systems to the republic, Belarusian President Alexander Lukashenko said on Monday.

"This issue was raised before the president of Russia so that the S-400s can be delivered to the Republic of Belarus at a reasonable price on a loan because we do not have such money," Lukashenko said at a meeting with journalists and public figures.

"The S-400 evokes our great interest. That is why, we speak about that and I am confident that we will get these systems," the Belarusian president said.

Belarus intends to spend some funds received from Russia as a loan for the construction of a nuclear power plant for purchasing modern Russian weapons, Lukashenko said.

"We have saved substantial funds on the nuclear power plant," he said. "I am ready to spend this part and this involves from $300 million to $500 million, at internal Russian prices, on a considerable amount of military and technical equipment, including S-400s, this is what we are talking about," the Belarusian president said.

Lukashenko said he had given instructions to ensure the security of the Belarusian nuclear power plant from the air and the most advanced air defense force armed with Russian-made Tor-M2 anti-aircraft missile systems was deployed in the area of the NPP. State Secretary of the Belarusian Security Council Alexander Volfovich who was present at the meeting said that the plan of developing the republic's armed forces stipulated purchasing at least three more Tor-M2 batteries.

"In our time, we chose the Tor-M2. This is a good weapon and we know both how to use it and modernize it. We can both restore and repair it," Lukashenko said.

The armor repair plant and several private companies in Belarus specialize in repairing and upgrading Russian-made S-300 and Buk air defense systems, he added.

Belarus is set to rearm its air defense troops and furnish them with S-400 anti-aircraft missile systems developed in Russia, Commander of the Belarusian Air Force and Air Defense Troops Lieutenant-General Igor Golub said in January.

First Deputy Director of Russia's Federal Service for Military-Technical Cooperation Andrei Boitsov said in late June this year that Russia was ready to consider the deliveries of S-400 surface-to-air missile systems and Pantsyr-S1 anti-aircraft missile/gun launchers to Belarus if Minsk filed the relevant request.

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The drones will operate in a contested airspace. Because it will eventually have its own censors and armament, it reduces the time from spotting a target and launching a strike from elsewhere.

Lockheed Martin takes aim at satellite servicing market

Sandra Ervin | 10 August 2021

Source: Space News | https://spacenews.com/lockheed-martin-takes-aim-at-satellite-servicing-market/

HUNTSVILLE, Ala. — Lockheed Martin plans to launch two cubesats later this year to demonstrate how small satellites can service other satellites in orbit, the company said Aug. 10.

A pair of 12U cubesats have completed environmental testing and will launch as early as this fall to perform a demonstration in geosynchronous Earth orbit called LINUSS, short for Lockheed Martin In-space Upgrade Satellite System, the company said.

The intent is to show how small satellites can be used to upgrade constellations or provide life-extension services like refueling.

"LINUSS will be the first step flight-qualifying this technology," said Chris Crawford, vice president of advanced program development for Lockheed Martin Military Space.

The company's near-term goal is to service the next generation of Global Positioning System satellites known as GPS 3F that use Lockheed Martin's LM 2100 satellite bus platform.

The mission will seek to "validate essential maneuvering capabilities for Lockheed Martin's future space upgrade and servicing missions, as well as to showcase miniaturized space domain

awareness capabilities," said Crawford.

Other companies participating in the demonstration include Innoflight for satellite avionics and VACCO Industries for propulsion. Lockheed Martin developed the inertial measurement units, machine vision and software needed for in-space docking.

David Barnhart, LINUSS program director, said the company also wants to show that cubesats can provide more payload accommodation and on-orbit processing than other small satellite platforms currently in the market.

The LINUSS cubesats were developed in collaboration with Tyvak Nano-Satellite Systems, a Terran Orbital Company in which Lockheed Martin made a strategic investment.

A spokesman told SpaceNews that the cubesat form factor was chosen for this demonstration to "rapidly prove out technology on orbit" and the long-term goal is to scale it up to larger systems.

America's premier missile detection satellite system was credited with giving a last-minute warning to war fighters in Iraq who were able to seek shelter from incoming missiles launched from Iran.

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Lockheed proposes to set up MRO facility for F-21s in India

12 August 2021

Source: Mint | https://www.livemint.com/industry/manufacturing/lockheed-martin-says-open-to-setting-up-mro-facility-for-f-21-in-india-11628693799311.html

US aerospace company Lockheed Martin Corp. is open to setting up a maintenance, repair, and overhaul (MRO) facility in India for F-21 to further sweeten its bid for the 114 fighter aircraft for the Indian Air Force (IAF), its representatives said on Wednesday.

Michael Kelley, vice president, India, Lockheed Martin aeronautics strategy and business development, and Brett Medlin, the F-21 India campaign lead, are in the country to hold talks with government and IAF officials on the multibillion-dollar deal. This comes against the backdrop of India planning to procure 114 medium multi-role combat aircraft (MMRCA) for the air force.

Lockheed is competing with Boeing's F-18, Swedish SAAB's Gripen, Dassault Aviation's Rafale, EADS' Eurofighter Typhoon, and MiG-35 of Russia's United Aircraft Corp.

Lockheed has already tied up with Tata group to locally manufacture the aircraft. It had previously promised to shift its production line to India if it secures the MMRCA deal and not sell the F-21 to any other country. "Once you build an airplane and put it together in the country you also know by extension how to take it apart," Kelley said.

"So you have the fundamental competencies of an MRO once you put the final assembly and checkout capability. If you add to that the ecosystem of the different avionics and subsystems, there will be Indian companies in the supply chain feeding the checkout facilities. So yes, there will definitely be the possibility for MRO. It has got to be competitive because obviously IAF would want to do the MRO

here, but bringing other aircraft to do MRO, Indian industry has got to be competitive in bringing that work here," Kelley said.

Once an MRO facility is built in India the aircraft need not be taken to the US or other countries where Lockheed has an established MRO unit, according to analysts. "It is, however, unclear if this means that engine overhaul will be done at the Indian facility, considering that Lockheed does not manufacture engines. Another point is that if the F-21 is only offered to India, as Lockheed has said, I am not sure of the economics of the MRO proposal. For instance, how aircraft of other countries can be serviced at the Indian unit," said a person aware of the matter, seeking anonymity.

Kelley said he was hopeful that India could come up with a decision on procuring the MMRCAs by the first quarter of 2022. When asked how the F-21 would fit in with the requirements of the IAF, which has already procured 36 Rafales from France and has allocated ₹48,000 crore for state-run Hindustan Aeronautics Ltd to manufacture 83 Tejas, a light combat aircraft, Medlin said, from an operational perspective, the F-21 complemented both the Tejas and the Rafale.

"If you assess what is the fighter squadron requirement of Indian Air Force, they are operating well below that. If you look at the pace of deliveries of the Tejas versus their requirement, the force structure gap that the IAF has, what the F-21 will provide is help fill that gap of capacity as well as capability for the IAF," Medlin said.

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Indian Aerospace Industry

Project Cheetah set to take off, India to get upgraded & armed drones from Israel

Snehesh Alex Philp | 03 August 2021

Source: The Print | https://theprint.in/defence/project-cheetah-set-to-take-off-india-to-get-upgraded-armed-drones-from-israel/708122/

After several rounds of discussions, Project Cheetah, under which India's Heron drones are to be upgraded and armed with Israel's help, is finally set to take off, ThePrint has learnt.

Sources in the defence and security establishment said cost negotiations for the nearly Rs 5,000 crore project involving Herons that are in service with the Indian Air Force (IAF), Army, and the Navy, has been completed and is in the last stage of decision making.

The companies will use digital engineering practices not only to design the satellites, but to validate whether they can effectively operate in medium Earth orbit.

The Indian Air Force, which is the end agency for this project, is looking at a timeline within this fiscal to sign the contract, sources said.

Under the project, the Medium Altitude Long Endurance (MALE) Israeli Herons, used by all three Services, will be upgraded.

This upgrade will include enabling the Herons with the capability of satellite navigation and specialised sensors.

But the icing on the cake is the plan to arm them. Under the contract, the Israelis will upgrade the Herons with the ability to not only undertake more specialised and longer surveillance missions but

also precision strikes.

The Herons will have the capability to carry and launch air-to-ground precision missiles, sources said.

The development comes at a time when the Indian defence forces have also decided to jointly procure 30 High Altitude Long Endurance armed drones, MQ-9B, from the US.

It's a very affordable approach where you can develop sensors that can operate in different orbit regimes without having to radically change those sensors,

Sources explained that both systems are different in capability and use. Hence, there is no overlap.

Sources said that after the Rafale fighter jet contract, the priority was 83 LCA Mk 1 A deal which was inked earlier this year. Other priorities included certain missile systems among others.

Also read: Navy to scrap plans to procure guns from US, considering 'Make in India' route now

Project first initiated by IAF

Sources said that Project Cheetah was first initiated by the IAF in 2013. At that time the IAF was planning to upgrade the Herons in use with them.

Subsequently, a decision was taken to upgrade the Herons in service with the Army and the Navy as well.

There was also a plan to buy armed predator drones in larger numbers from the US, but it was shelved as the systems were proving to be very expensive.

Sources explained that the upgrade of the Herons serves the purpose it is intended for since the idea is to equip these systems with anti-personnel and anti-armour missiles, which will be smaller than the traditional ones.

"The drones will operate in a contested airspace. Because it will eventually have its own censors and armament, it reduces the time from spotting a target and launching a strike from elsewhere. The idea of having such systems is that it reduces the risk against pilots flying the fighters," a former senior IAF officer explained.

The officer explained that the other Israeli surveillance drone in use with the Indian forces, Searcher, cannot be armed because they are smaller in size.

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Nirbhay cruise missile test-fired; indigenous engine a success

Shishir Pupta | 11 August 2021

Source: India News | https://www.hindustantimes.com/india-news/nirbhay-cruise-missile-test-fired-drdo-says-indigenous-engine-a-success-101628656458294-amp.html

After the October 2020 failed test, the Defence Research and Development Organisation (DRDO) on Wednesday fired the 1,000-km range Nirbhay cruise missile from Chandipur testing facility in Odisha. The sub-sonic cruise missile was fired at 9:55am and was tested for 100 km in flight and 15 minutes in time.

The firing was a partial success. According to DRDO sources, the indigenous engine was successfully tested but the delivery platform came down due to inexplicable reasons. "Maybe a snag in the controller, but the engine worked well. Next test firing will be done in mission mode before user trial for air force and navy," said an official.

This was the first successful test-firing with the indigenous booster engine after the previous one had to be aborted after eight minutes flying time.

Nirbhay is a subsonic missile, flying at a speed of 0.7 to 0.9 Mach, with sea-skimming and terrain-hugging capability that helps the missile stay under enemy radar to avoid detection. It is a two-stage missile with first stage using solid fuel and the second using liquid fuel. It carries a convention warhead of 300 kilograms weight and can hit targets upto 1500 km range. The missile is capable of flying between 50 metres to four km from ground and pick up the target before engaging and destroying it.

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Technology Development

Digital engineering shows promise of cheaper, more flexible missile warning constellations

Nothan Strout | 10 August 2021

Source: C4ISRNET | https://www.c4isrnet.com/battlefield-tech/space/2021/08/10/digital-engineering-shows-promise-of-cheaper-more-flexible-missile-warning-constellations/

WASHINGTON — For decades, the United States has used the same approach to detecting ballistic missiles from space: Put a handful of satellites with infrared sensors high in orbit and spread them out to achieve 24/7 coverage of the Earth's surface.

This effort is a key component of SMC's Digital Engineering strategy, enabling the government to incorporate and connect multiple contractor models in an automated digital environment.

And it's largely worked. The Space Force tracks thousands of missiles a year, and in one high-profile case in 2020, America's premier missile detection satellite system was credited with giving a last-minute warning to war fighters in Iraq who were able to seek shelter from incoming missiles launched from Iran.

But that constellation structure is no longer sustainable. The proliferation of anti-satellite weapons is challenging the approach. It no longer makes sense, U.S. military leaders have said, to put all of their billion-dollar eggs in one basket.

What the Space Force wants is a distributed architecture, meaning more satellites for each capability that are layered in different orbits. Instead of just having a few missile warning satellites in geostationary orbit at 22,236 miles above the Earth's surface, the service wants to place some in medium Earth orbit — the area from 1,243 miles above Earth up to geostationary orbit.

Meanwhile, the Space Development Agency is developing a new constellation that will also track missiles, made of hundreds of satellites closer to the surface in low Earth orbit. Those are to start operating years before the Space Force could

expand its missile warning system.

That sort of distributed architecture across the three levels of orbit not only would offer flexibility; it would ensure adversaries can't knock America's space capabilities offline by disabling or destroying a single satellite. If the satellites in geostationary orbit aren't available, the Space Force can rely on satellites in other orbits.

Now, digital engineering tools are giving Space Force officials new insight into how to achieve that distributed architecture to augment high-orbit satellites that watch for missiles. The service is heavily investing in digital engineering concepts that have made headway in parts of the aerospace community and other industries, enabling it to test and validate new satellite designs and constellation structures in a digital environment. More than simply providing graphics, the tools allow users to test their designs in simulations that accurately represent space environments, and track how changes affect performance.

The UK's Gravitilab is working with the British National Composites Centre (NCC) on the analysis and design of new composite flight structures for Gravitilab's fleet of suborbital launch vehicles.

America's next missile warning constellation — the Next Generation Overhead Persistent Infrared — was designed as one of those large, exquisite systems with sophisticated, expensive technology. The first block will comprise five satellites placed in high orbit, effectively replacing the Space Based Infrared System satellites in a like-for-like move with some small changes. The Space and Missile Systems Center awarded Lockheed Martin $2.9 billion in 2018 to design three geostationary satellites, and $4.9 billion in 2021 to build them. Northrop Grumman secured $2.4 billion to design the constellation's two polar satellites.

But in May, the Space Force announced two contracts that could radically change the future of the system. The SMC issued two awards — $29 million for Raytheon Technologies and about $28 million for Millennium Space Systems, a Boeing subsidiary — to build digital models of the next generation of Next Gen OPIR satellites. The companies will use digital engineering practices not only to design the satellites, but to validate whether they can effectively operate in medium Earth orbit.

A transition to MEO satellites would be a seismic shift for America's missile warning architecture, and the move to use digital engineering provides one of the first looks at what the Space Force meant when it said it wanted to be the world's first fully digital service.

Why branch out to other orbits?

According to Rob Aalseth, executive director with strategic systems in Raytheon Intelligence and Space's space and command-and-control systems division, this journey began in 2019. That year, the company secured a study contract from the SMC to perform reconnaissance on the maturity of technologies in industry for the Block 1 satellites for Next Gen OPIR. The Space Force awarded the company a follow-on option for that effort to discuss how it could change the system's architecture.

"One of the areas that we had discussed at great length was moving sensors to medium Earth orbit,

MEO, and there was a lot of benefits. For one, there's some sensitivity gain because you're a little closer to the Earth," Aalseth told C4ISRNET.

In fact, MEO covers a broad swath of space significantly closer to the planet. While geostationary orbit is constant at 22,236 miles up, MEO covers everything below that down to 1,243 miles above the Earth's surface. While most major Pentagon-owned satellites operate in GEO, the department has some in MEO — most notably the GPS constellation.

"MEO has a lot of great benefits," said Millennium Space Systems CEO Jason Kim. "What MEO does is you can see a larger swath of the Earth with less satellites than in LEO — LEO you would need hundreds of satellites to get to global coverage, and if you lose some of the satellites in critical spots that opens up a gap in coverage. LEO is also limited by the horizon."

That poses a challenge for SDA's planned LEO missile tracking satellites, which will operate closer to Earth to more easily detect hypersonic weapons. Their limited vantage means they only track the weapons for a short period before those missiles disappear behind the horizon.

The SDA hopes to solve that problem by creating an on-orbit mesh network connecting hundreds of missile warning satellites, enabling them to pass tracking custody from satellite to satellite as threats travel around the world. Higher up in orbit, a MEO satellite can track threats longer before the horizon cuts off its view.

For Kim, MEO represents a better option than LEO and GEO. It has more satellites than GEO to provide resiliency but doesn't need the massive number of satellites required for worldwide coverage in LEO.

As part of its study contract with the Space Force, Raytheon used internally developed algorithms to show how placing Next Gen OPIR satellites in MEO could provide resiliency through layers while also picking up performance at a discount over exquisite systems' prices.

While neither company provided estimates for what their satellites could cost, MEO satellites are typically smaller, making them cheaper to produce and launch.

"It was a neat thing to watch the lightbulb go on when they realized just how capable some of these things could be if you just applied certain algorithms in novel ways and you applied sensor combinations in novel ways that they really hadn't sort of conceived of," Aalseth said.

Both satellite designs under development by Raytheon and Millennium would be able to operate in MEO and GEO, giving the government flexibility.

"It's a very affordable approach where you can develop sensors that can operate in different orbit regimes without having to radically change those sensors," Aalseth said.

Not only would the offered solutions improve the capability and resiliency of the constellation — both Kim and Aalseth said their satellites would be cheaper than the status quo.

"We went with a compact vehicle that is high performing and affordable, so our customers could

pay significantly lower costs for more satellites. And we've already demonstrated that our system provides a significant improvement in capability by using SBIRS data in a high-fidelity simulation," Kim said.

To briefly restate: The contractors assert that adding a MEO Next Gen OPIR architecture would be cheaper and more resilient, and deliver a higher-resolution product. And if the Space Force likes what it sees from these contracts, there could be lucrative awards for the two companies in the near future. Following critical design review of the payloads in 18 months, the Space Force could pick up future options for integration and launch of up to three space vehicles from each provider to start the more spread-out design, said Kim.

Just as radical as the potential changes to the Space Force's missile warning architecture are the new digital engineering priorities of this contract

How digital engineering works

Just as radical as the potential changes to the Space Force's missile warning architecture are the new digital engineering priorities of this contract.

Aalseth said analog design practices are more divided, with individuals and teams working on the satellite system's different parts. In that environment, it might not be immediately apparent how a change on one part could affect the rest of the system. With digital engineering, on the other hand, every team member has access to every part of the design, and changes to one part of the system are reflected immediately in the digital model. The team is able to see how work by an individual affects system performance.

The high-fidelity environments that digital engineers use more accurately show how the system will work on orbit. They're more than simple animations — engineers are able to take the actual dimensions, capabilities and physical properties of the system and test them in a realistic re-creation.

"You can float requirements all the way through, but digitally. You actually have a full representation of a product as well as all of the parameters to a high level of detail," Aalseth said. "You could actually measure the performance of your electronics against the output, because it's a realistic depiction."

Announcing the digital engineering-focused contracts in May, SMC Program Executive Officer for Space Development Col. Timothy Sejba said they would "support U.S. Space Force's architecture analysis by providing realistic cost, schedule and performance predictions, essentially enabling a digital 'try it before you buy it' approach."

Digital engineering contributes to the Space Force's goal of avoiding vendor lock. With standard industry tools, the Space Force can take parts or satellites from third parties, introduce them into the digital environment and see how they impact its systems.

"This effort is a key component of SMC's Digital Engineering strategy, enabling the government to incorporate and connect multiple contractor models in an automated digital environment," Sejba said.

This is the first major contract announcement to emphasize digital engineering since the Space Force declared earlier this year that it would be the world's first digital service, though industry and significant parts of the aerospace community already use digital engineering practices.

"But this is more of a new approach, as you know, for space. The airborne world has adopted this for several years, and then the Formula race car world and the automobile world has adopted this for many, many years," Kim said.

Millennium Space learned about digital engineering from its parent company and will use the same industry standard tools the Space Force is adopting.

"We have an incredible opportunity to help the U.S. Space Force with the digital models and show the benefits of using these digital models in the trade space to move fast and also to have the flexibility to trade multiple designs and validate those designs as you're building the systems," said Kim

Millennium Space learned about digital engineering from its parent company and will use the same industry standard tools the Space Force is adopting.

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A carbon-fibre propellant tank, which also forms part of the outer skin of the launch vehicle, is under development

10 August 2021

Source: PlasticsToday Staff | https://www.plasticstoday.com/automotive-and-mobility/new-composite-structures-suborbital-launch-vehicles

The UK's Gravitilab is working with the British National Composites Centre (NCC) on the analysis and design of new composite flight structures for Gravitilab's fleet of suborbital launch vehicles. Gravitilab provides sustainable suborbital launch technology with reusable rockets and environment-friendly hybrid propellants that deliver sustained and stable microgravity conditions for space hardware and scientific research campaigns.

Composite materials are known for their low mass and high strength, making them the ideal solution to optimize Gravitilab's vehicle fleet. Working with the Defence and Space team at the National Composites Centre, the Gravitilab team is investigating, designing, and trialing a carbon-fiber propellant tank that also forms part of the outer skin of the launch vehicle, thereby reducing complexity and mass. Approximately 30% of the rocket is composite — a sector first — and Gravitilab has plans to increase this in later versions, assuming performance targets are achieved. Gravitilab is also working on projects with the NCC's SME engagement team, NCC Connect.

Gravitilab's initial launch vehicle MAX has been operational for three years. Used widely in testing programs for the European Space Agency, the three MAX rockets can carry between 1.2- and 3-kg payloads and can reach between 0.8 and 1.81 km altitude. ADA, the company's new 80-km suborbital rocket, is set for flight testing in March 2022, and ISAAC, capable of a 120-km distance, is set for its maiden flight in October 2022.

Announcing the partnership, Gravitilab

Technical Director, Rob Adlard said: "The collaboration with the National Composites Centre forms part of Gravitilab's ongoing research and development program to optimize launch vehicles that are lighter and more cost-effective than anything that currently exists in the market. The opportunity to partner with the NCC enables disruptive space companies such as Gravitilab to access the latest composites expertise and technology to exploit the huge benefits of composite materials for our lightweight but robust reusable launch vehicles."

Sean Cooper, Chief Engineer for Defence and Space at the National Composites Centre, said: "We are delighted to be supporting Gravitilab with the ongoing research and development for using advanced composite materials in their family of sub-orbital launchers. The adoption of new lightweight materials is going to make a step-change for future cost-competitive launch in the UK, and Gravitilab [is] pushing the limits of composite materials technology for their ADA and ISAAC launchers as part of some very exciting near-future engineering projects. It is great for the NCC to play our part in that story," said Cooper.

The Centre for Air Power Studies (CAPS) is an independent, non-profit think tank that undertakes and promotes policy-related research, study and discussion on defence and military issues, trends and developments in air power and space for civil and military purposes, as also related issues of national security. The Centre is headed by Air Marshal Anil Chopra, PVSM AVSM VM VSM (Retd).

Centre for Air Power Studies
P-284 Arjan Path, Subroto Park, New Delhi - 110010
Tel.: +91 - 11 - 25699131/32 Fax: +91 - 11 - 25682533
Email: capsnetdroff@gmail.com
Website: www.capsindia.org

Editorial Team: AVM Anil Golani, Gp Capt T H Anand Rao, Dr. E Dilipraj

Composed and Formated by Mr Rohit Singh, CAPS
Tel.: -91 9716511091
Email: rohit_singh.1990@hotmail.com