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Greetings on India's 73rd Republic day

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"Victory smiles upon those who anticipate the changes in the character of war, not on those who wait to adapt themselves after the changes occur."

- Guilio Douhet

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If War Starts: How Would Russia's Air Force Deal With Ukraine's Air Defenses?

Sebastien Roblin | 07 January 2022

Source: 19fortyfive | https://www.19fortyfive.com/2022/01/if-war-starts-how-would-russias-air-force-deal-with-ukraines-air-defenses/

Tu-22M3M Russian Aircraft. Image Credit: Creative Commons

The Need for SEAD: How Will Russia's Air Force Deal With Ukraine's Air Defenses?: In the opening weeks of 2021, Moscow has massed extensive ground forces near Ukraine and is making what analysts fear are genuine threats of military action against Kyiv unless NATO and Washington concede to its demands. And unlike Russia's actions in Eastern Ukraine in 2014-2015, an attack in 2022 is likely to involve full employment of Russian combat aviation and tactical ballistic missile systems to ravage targets across Ukraine.

However, Russian air and missile strikes would need to overcome Kyiv's Soviet-era ground-based air defenses effective against high-flying aircraft. As detailed in this earlier article, these predominantly consist of old S-300PS/PT and Buk-M1 long- and medium-range surface-to-air missile systems (SAMs) effective out to 56 and 22 miles respectively, and missile-armed 9K33M3 Osa vehicles for local area defense (range 9 miles) of ground forces.

Ukrainian ground forces also deploy numerous low-altitude defenses including man-portable Strela missiles, and ZSU-23-4 Shilka, and 9K35 vehicles that particularly threaten helicopters and smaller drones. Those are important, but Russian warplanes can fly above their engagement range and drop precision munitions or bombs with reduced accuracy, as done in Syria's civil war.

Despite its datedness, Ukraine's Integrated Air Defense System (IADS) is large—counting in the low-to-mid hundreds of short- and medium-range systems—and could still inflict significant losses if Russian forces don't systematically mount a Suppression of Enemy Air Defense (SEAD) campaign. Russia would also require extremely thorough SEAD operations in any attempt to insert elite mechanized airborne formations behind the frontline to avoid losses of transport aircraft full of paratroopers.

The cornerstone of SEAD tactics involves luring air defense systems into activating their radars and then targeting those radars with anti-radiation missiles (ARMs) that home in on radar emissions. Because radar-homing missiles have small radar signatures and their passive seekers don't emit a signal of their own they can be difficult to detect until too late. Furthermore, modern ARMs like the Kh-31 typically can head to the last known position of an emitter, forcing

air defense operators to both shut down their radar and move promptly to ensure survival. Once the radars are destroyed or forced to deactivate, surface-to-air missile launchers are left blind and ineffectual.

Russia's military is aware of the need for SEAD, and fields a variety of missiles for the mission and trains on their employment. However, neither Russia nor the Soviet Union ever conducted a SEAD operation comparable to U.S. and Israeli campaigns neutralizing IADS in the Middle East.

In the five-day Russo-Georgia war in 2008, Russian Tu-22M and Su-34 bombers belatedly employed Kh-58 ARMs against Georgian radars. But Georgian air defenses still shot down two or three Russian combat aircraft, including a high-flying Tu-22MR reconnaissance plane, while three or four more Russian warplanes were mistakenly downed by Russian forces due to poor Identity-Friend-or-Foe systems and airspace management.

Russia's military has improved substantially since 2008, but how much better could it perform facing Ukraine's more extensive air defenses?

Leonid Nersisyan, a defense analyst with expertise related to Russian military aviation, wrote to me in an email: "Russia made a serious step forward in air warfare and SEAD capabilities particularly after the August 2008 war in Georgia. This includes procurements of hundreds of new combat aircraft (most of them are 4+ generation fighters and frontline bombers), modernization of older aircraft (for example, Su-25 to Su-25SM3), and procurement of precision-guided airborne munitions. At the same time, there is a lack of real combat experience in conducting SEAD operations, if we are talking about the hypothetical full-scale war between Russian and Ukraine."

Russian SEAD Tactics

Tom Cooper, a military aviation historian and author of a book on Russian combat aviation in Syria, wrote to me that Russia's tactical ("frontal") aviation is seen principally as an enabler of Russian ground forces. Thus, he believes SEAD attacks would simply be integrated to enable specific missions.

"In the West, we think something like, 'first we win air superiority, destroy the enemy air defenses and air forces, then we do everything else'. The Russians do not think that way… Operationally, [Russian air force] units are subjected to the local Military District commands, all of which are dominated by commanders of ground forces. Therefore, it's out of the question for the VKS to run something like 'its own air war'…their tactical manual dictates no separate SEAD operations: instead, either two or all four in the leading zveno (four-ship flight) of aircraft of every squadron, is armed with ARMs, and targeting enemy air defenses."

Though skeptical Russia would commit to war with Ukraine, he continued: "If this would be an all-out effort…then they would operate in waves of regiment-sized formations. Say three waves a day, each consisting of 3-4 regiments, and every wave would start with a regiment-sized SEAD

effort including Tu-160s, Tu-95s, and Tu-22M [strategic bombers] using cruise missiles, and Su-34s for Kh-58 [anti-radiation] missiles."

Cooper doubted Russia would employ its Su-30SM or Su-35S multi-role Flanker fighters in a SEAD role, as he believes these would need to be dedicated to interceptor/air-superiority missions.

Platforms and Systems

Fixed radar installations and missile batteries such as Ukraine's S-125 Pechora batteries may be targeted with Kh-555 or Kh-101 cruise missiles launched by Russian Tu-95 or Tu-160 strategic bombers, or land-based Iskander ballistic missiles and Novator cruise missiles. Furthermore, Iskander missiles may be equipped with non-nuclear electromagnetic pulse warhead to knock out enemy radars.

But Ukraine's mobile SAM systems and Pelican and Phoenix surveillance radars may compel Russia to dip into its varied stockpiles of anti-radiation missiles.

The most advanced is the Kh-31P (AS-17 Krypton) which accelerates to Mach 2 using a rocket booster, then sustains high speed using a ramjet engine, making it highly difficult to shoot down. Originally developed to home in on the radars of NATO I-Hawk and Patriot missile batteries from 70 miles away, the latest 1,570-lb Kh-31PD variant features a heavier 242-lb cluster munition, range extended to 155 miles, and an L-130 broadband (1.2-11 GHz) seeker to replace the three seeker-types of earlier models.

Russian Su-24M or Su-34 bombers may also use older Kh-58U ARMs (NATO codename AS-11 Kilter) with a range of 155 miles and Mach 3.6 supersonic cruise. Russian Tu-22M and Tu-160 bombers theoretically could also employ the Kh-15P anti-radiation air-launched ballistic missiles (range 170 miles), but it's not clear whether those remain in service.

Tactical aircraft may instead use the lighter, shorter-range Kh-25MPU (AS-12 Kegler) anti-radiation missile with a range of 25 or 37 miles that arcs up and then dives at low supersonic speeds (Mach 1.3). The lighter 694-pound ARM may be mixed in with a conventional strike payload and used reactively against short-range and tactical air defense systems like the 9K35 or ZSU-23-4 Shilkam should they emerge as a threat.

Russian ground forces may also employ potent electronic warfare systems, notably the Krasukha-4 ("Belladonna") consisting of two 8×8 trucks. Principally aimed at blinding surveillance/reconnaissance aircraft and satellites, and disabling drones (such as Ukraine's Bayraktar combat drones) from up to 186 miles away, they may also be used to blind ground-based radars, helping pave the way for aviation operations.

Altogether, Russian aviation and ground forces dispose of multiple methods to blind or destroy air defense radars. However, how well those capabilities would be used in a coordinated and systematic fashion to mitigate losses remains to be seen.

It's worth bearing in mind that ground-based air defense commanders have agency too and

may subvert technically superior adversaries by constantly re-positioning and concealing radars and launchers, conducting surprise ambushes under maximum range, and making smart use of intelligence. That's how in 1999 a Serbian commander using a 1960s-era S-125 missile shot down an F-117 Nighthawk, the only manned stealth aircraft lost to enemy fire.

Still, Nersisyan wrote me: "The massive usage of new and modernized combat aircraft (Su-30SM, Su-35S, Su-34, Su-25SM3, etc.) carrying anti-radiation missiles (Kh-58, Kh-31) and precision-guided missiles along with usage of land-bases tactical missiles (Iskander-M) and a combination of artillery and ISR UAVs [surveillance drones], will allow Russian forces to effectively suppress the Ukrainian air defense, especially the longer-range systems which are less mobile (like S-300PS). The lack of experience may bring additional casualties, but the final result is not a matter of questioning."

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US' Lack of Space Cooperation With China is Dangerous and Counterproductive

David Dodwell | 22 January 2022

Source: South China Morning Post | https://www.scmp.com/comment/opinion/article/3164182/us-lack-space-cooperation-china-dangerous-and-counterproductive

China's Mars orbiter Tianwen-1 is seen circling above the north polar region of the Red Planet on January 1, 2022. Photo: Xinhua

In 1957, when Russia shocked the world with the launch of its first Sputnik satellite, Mao Zedong is said to have lamented that China could not even get a potato into space.

Sixty-five years later, President Xi Jinping's "space dream" now includes three taikonauts at work in the near-complete space station Tiangong, or Heavenly Palace, orbiting 400km (248 miles) above Earth, and a Chang'e rover launch to explore the dark side of the moon.

China has put a Tianwen (Questions to Heaven) rover on Mars, and plans for a Xuntian (Survey the Heavens) telescope to be launched in 2024. It is also set to develop a 13,000-satellite broadband constellation. Missions to Venus and Jupiter are on the drawing board too.

There are visions of mining the moon

and generating solar power in space, while leapfrogging the West in artificial intelligence, robotics and quantum computing. Mao would be proud, and probably much less concerned about potatoes.

One can understand why the United States, for so long the world's paramount space power, feels that China's space dream amounts to an existential challenge, and one of a growing list of reasons that underpin an urge to block China's relentless rise and its access to the latest technologies.

Chinese space progress, quite understandably, poses an existential challenge to the US.

Given the inherently dual-use nature of all space technology, there is little work done in space research and exploration that might not be perceived as a defence threat.

China's very conspicuous space progress coincides with – and contributes to – rising anxiety about the potential for controversy, conflict and accidents in space.

While space activity was, not so many decades ago, seen as the remote and exotic subject of science fiction writers, it has today assumed practical relevance with the potential to profoundly impact our daily lives.

The Space Foundation's Space Report 2021 talks of space research as a vital enabler at the heart of progress in energy generation, security, meteorology, aviation, telecoms, maritime activity, transport and urban development.

Of the US$447 billion spent on space in 2020, the lion's share (US$357 billion) was spent not by the military, but by commercial enterprises like Elon Musk's SpaceX, Richard Branson's Virgin Galactic, Jeff Bezos's Blue Origin and the Sierra Nevada Corporation headed by Fatih and Eren Ozmen. Governments accounted for just US$90.2 billion in space spending – with the US still accounting for 58 per cent of this.

While there is criticism of the likes of Bezos and Musk squandering their earthly fortunes on "vanity projects" and space tourism, there seems increasing scope for private enterprise to contribute meaningfully and valuably in space.

And since the world's top 10 billionaires, including Musk and Bezos, saw their fortunes grow by US$800 billion, to US$1.5 trillion, over 2020 and 2021, there are plenty more billions for future "vanity projects", including a US$100 billion manned mission to Mars.

The recent explosion of space activity is indeed head-spinning. Satellite launches have surged from 10 to 60 annually up to 2010, and to 1,400 last year, lifting the total number of satellites in low-Earth orbit to 7,500 by last September.

And this is just the start. Between them, SpaceX, OneWeb, Amazon and China's Satellite Network Group have proposed a total of 65,000 satellites in low-Earth orbit (up to 2,000km from Earth), while Rwanda has announced a plan for a mega constellation, called Cinnamon, of possibly 320,000 satellites.

All of a sudden, space seems to be becoming very crowded. Hugh Lewis, at the University of

Southampton's Astronautics Research Group, says there are now around 1,600 close encounters every week involving SpaceX's Starlink satellites. So much for Musk's claim that there is room for "tens of billions" of spacecraft to orbit close to Earth.

Aaron Boley, at the University of British Columbia, is not alone in seeing an alarming risk of accidents, and collisions with space debris. He has calculated that there are 12,000 trackable debris pieces (10cm or larger) currently in low-Earth orbit, with at least a million pieces down to 1cm.

He is troubled by the danger of the "Kessler Syndrome" predicted by Nasa scientist Donald J. Kessler in 1978 – in which the amount of junk in orbit around Earth reaches a point where it just creates more and more space debris, causing cascading problems and ultimately gridlock for all satellites in low-Earth orbit.

These pressing dangers clearly scream out for international cooperation to avoid the creation of debris and accidental explosions, and to follow agreed rules on rights of way to avoid collisions. "We risk multiple tragedies of the commons in space," warns Boley.

An obvious agency to set such rules would be the UN Committee on the Peaceful Uses of Outer Space, and this is indeed where Beijing has sought multilateral agreements on space.

But, so far, the US has preferred a different route, signing Artemis Accords on norms of behaviour in space with seven allies last year. Because the US Congress' 2011 Wolf Amendment blocks Nasa from any cooperation with China in space, Beijing is not eligible to sign the Artemis Accords.

As long as this amendment remains in place, and assuming China has no plans to abandon its space dream, then Beijing can have no choice but to set its own rules and protocol – surely a recipe for danger.

To many experts, it has already become clear that simply blocking dialogue and cooperation with China is counterproductive and dangerous – as much in tackling pandemics and global warming as in managing activity in space.

Pushing China to develop a separate, parallel strategy in space is a clear and certain route to counterproductive competition and future conflict. It will neither puncture China's space dream, nor help anyone's.

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After Abu Dhabi, Is Dubai Next? Why Drones Have Become Weapon of Choice for Terror Attacks

Group Capt MJ Augustine Vinod VSM (Retd) | 20 January 2022

Source: News 18 | https://www.news18.com/news/opinion/after-abu-dhabi-is-dubai-next-why-drones-have-become-weapon-of-choice-for-terror-attacks-4678595.html

Drones have become a weapon of choice for terrorists and separatists to launch attacks,writes M. J. Augustine Vinod. Photo: PTI

The drone attack in Abu Dhabi is one among the many such attacks that have taken place in the recent past, using drone as the weapon of choice. Drones have become the new tool in the fifth-generation warfare. The reason: drone offers a much cheaper attack solution without the need to be martyred while carrying out the attack; it also gives the much-needed visibility to an attack, which more often than not is the reason any terrorist element carries out an attack on the victim country.

The attack on Abu Dhabi's Musaffah area was premeditated and the choice of real estate for the attack was brilliant. Musaffah is centrally located and the smoke rising from the attack site would be visible from Khalifa City, Bani Yas and reclaimed islands like Halat Al Bahrani. On the face of it, the monetary loss to the United Arab Emirates due to this attack may have been negligible. However, the loss of face, the loss of standing among the international community who considered UAE to be a very secure nation, and the impact on its tourism industry are huge.

This, however, is not the first time that Yemeni Houthi rebel groups have attacked United Arab Emirates (UAE). Similar attacks took place in 2018 using Iranian drones called Samad and other homegrown drones.

Reasons for the Houthi group attacking its neighbours go back to the period of Karbala itself. Yemeni-based groups predominantly are of Shia Muslim origin and have been fighting with Sunni Muslims for a long time. Shia Muslims other than in Iran are a minority community in the Middle Eastern region. Bahrain is perhaps an exception, where despite being a majority community, Shias are not the ruling class and therefore perceived to be persecuted. The real reason for an attack like the one in Abu Dhabi is — it is perceived that the wealth the Middle East enjoys by selling crude and other petroleum products is not equally shared with the Shia population, or at least that is their gripe.

I have travelled extensively in the Middle East and I have no reason to believe that the Shia population enjoys any less facilities than the common Sunni population. Yes, they are not related to the ruling class and therefore are no princes who enjoy enormous wealth — the source of their disgruntlement is lack of wealth-sharing.

Communal angle is, in my opinion, just a reason to pick up the fight. The attack on Aramco facility in Saudi Arabia in 2019 or the recent UAE attack is testimony enough that the Shia population is feeling alienated.

In enters Iran in this whole quagmire of complicated relationship that Shia and Sunni Muslims share in this region. Iran definitely feels that they represent the real concerns of Shias outside of Iran. While that could be true, the perception that Shias are a persecuted lot may not be true at all, at least not from the perspective of an onlooker. For a simple reason that governments of the United Arab Emirates and Saudi Arabia do look after their citizens. Education, basic healthcare and other facilities that the government extends are not Shia- or Sunni- specific.

Take Yemen for example. Yemen sits astride the Gulf of Aden through which maximum economic activity takes place in the world. North of Yemen is Saudi Arabia and west of it is Oman. In fact, in the Middle East, Oman has been the only country that kind of maintained neutrality with its neighbours for a long time. Yemen has no truck with Oman, but feels aggrieved and intimidated by the presence of an older, stronger brother — Saudi Arabia. Yemen feels the Saudi government has been directly fomenting trouble against Shias in Yemen, which may not be true at all. In my opinion, I do not think a responsible government like Saudi Arabia's would have any direct involvement in troubling Zaidi Shia Muslims of Yemen. But more on this in another piece.

Why Use Drones for Attacks

The subject of discussion here is the use of drones as a weapon of choice by terrorists and separatist elements. In terms of technology and cost, Shahed and Samad class drones have unparalleled advantage. First and foremost, these cannot be detected by the most sophisticated air defence system in both Saudi Arabia and the United Arab Emirates, namely the Patriot Advanced Capability-3 (PAC-3) air defence system. The radar crosssection of these missiles and other missiles that Yemeni terrorists use is so little that it cannot be picked up by any radar system currently available.

While the second attack may not happen immediately because air and sea patrolling would have intensified, Yemen would wait for an opportune moment to strike again.

Moreover, the target that a Houthi group chose was a highly volatile one. For example, the flashpoint for petrol is minus 40 degrees centigrade and the ignition point for petrol is 280-degree centigrade and for diesel it is even lower at 210-degree centigrade. With such flashpoint and ignition point, all the terrorists need to do is to start the fire with some kind of high-temperature starters, like sodium-based starters. The fire then takes over and keeps the fuel burning, sometimes days on end, thereby sending a huge message to the victim country.

Could Abu Dhabi attack be a precursor to attacks in Dubai or elsewhere is a question the world is asking. In my opinion, an attack on Dubai is imminent and the fact that both Abu Dhabi and

Dubai are coastal cities, enemies sneaking into their international waters, which is just 25 km from the shore, and launching drones from highspeed boats is something that the United Arab Emirates cannot rule out. Therefore, it would need to invest heavily on patrolling these seas to ensure such an attack does not happen again on its soil. While the second attack may not happen immediately because air and sea patrolling would have intensified, Yemen would wait for an opportune moment to strike again.

Lessons for India here are huge. Many important industrial installations are along the coastal regions of India, namely Kalpakkam, Bhabha Atomic Research Centre, the oil facility at Jamnagar etc. Like I said before, in the international waters you can be just 25 km from the coast without any fear of interception. This allows many anti-national elements to approach these facilities unnoticed. Unlike the United Arab Emirates, Indian coastline is huge and it would be physically impossible to keep track of any inimical elements on the international waters. It is therefore imperative that India follows a multilayer strategy in protecting these facilities, which could also include good human intelligence. Owners of these facilities have a huge role to play. They cannot only rely on the country to provide security. They should invest in counter-drone solutions which are available in plenty.

Solutions like electronic jammers, nets protecting the heart of their facility, communication intelligence equipment and EMP (electromagnetic pulse) weapon system could cripple the incoming drone. Let us not wait for an attack like the one on Abu Dhabi to wake up and start acting. .

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Air Power

THAAD, in First Operational Use, Destroys Midrange Ballistic Missile in Houthi Attack

Jen Judson and Joe Gould | 22 January 2022

Source: Defence News | https://www.defensenews.com/land/2022/01/21/thaad-in-first-operational-use-destroys-midrange-ballistic-missile-in-houthi-attack/

The deployment of a THAAD System to Israel in 2019 was an exercise involving U.S. Army, U.S. Air Force and Israeli forces, under the Dynamic Force Employment concept. (Staff Sgt. Cory D. Payne/U.S. Air Force)

WASHINGTON — A multibillion-dollar missile defense system owned by the United Arab Emirates and developed by the U.S. military intercepted a ballistic missile on Monday during a deadly attack by Houthi militants in Abu Dhabi, marking the system's first known use in a military operation, Defense News has learned.

The Terminal High Altitude Area Defense System, made by Lockheed Martin, took out the midrange ballistic missile used to attack an Emirati oil facility near Al-Dhafra Air Base, according to two sources granted anonymity

because they are not authorized to speak about the UAE's activities. The Emirati base hosts U.S. and French forces.

The attack, which used cruise missiles, ballistic missiles and drones, killed three civilians and wounded six others, UAE's ambassador to the United States, Yousef Al Otaiba, said earlier in the week.

"Several attacks, a combination of cruise missiles, ballistic missiles and drones, targeted civilian sites in the UAE. Several were intercepted, a few of them [weren't], and three innocent civilians unfortunately lost their lives," Al Otaiba said at a virtual event sponsored by the Jewish Institute for National Security of America.

The Emirati Embassy in Washington did not immediately respond to a request for comment.

The UAE was a key member of the Saudi-led coalition that entered Yemen's civil war in 2015, after the Houthis had overrun Yemen's capital of Sanaa the previous year and ousted the country's president from power. Although the UAE has largely withdrawn forces from the conflict, it remains heavily involved in the war and supports local militias on the ground in Yemen.

U.S. Central Command on Friday confirmed "a potential inbound threat" had forced U.S. service members at Al-Dhafra into their bunkers, in a "heightened alert posture" for about 30 minutes Sunday night. Airmen were directed to keep their protective gear close for 24 hours afterwards.

"Everything was professional and disciplined. The 'all clear' was called at 9:27 p.m. local time," said Capt. Bill Urban, a spokesman for the command. "There was no mission impact."

THAAD, which is designed to counter short-, medium- and long-range ballistic missiles, was initially developed in the 1990s. It struggled in early testing, but has had a consistent reliability track record in flight tests since Lockheed Martin in 2000 won the development contract to turn THAAD into a mobile tactical army fire unit.

By 2019, the Missile Defense Agency had demonstrated the capability for the THAAD system to remotely fire an interceptor following 16 consecutive successful intercept tests.

The U.S. has deployed THAAD throughout the world, including to Guam, Israel, South Korea and Japan. In 2017, Saudi Arabia agreed to buy THAAD in a deal thought to be worth up to $15 billion. The UAE was the first foreign customer for the system and trained its first units in 2015 and 2016.

The Army operates seven THAAD batteries, but has long had a requirement to field nine total. The MDA has lacked the funding to build the final two, but U.S. lawmakers added funding in the fiscal 2021 budget to build an eighth THAAD battery.

The Houthis have used drones and missiles to attack Saudi Arabia and oil targets in the Persian Gulf over the course of Yemen's war, now in its eighth year. Monday's attack was the UAE's first acknowledgement of being hit by the Houthis. Several civilians have died in Saudi Arabia from cross-border Houthi attacks.

This week, Abu Dhabi asked the U.S. for help bolstering its defenses against missiles and drones and halting weapons from being transported to the Houthis, according to a statement the UAE's Embassy in Washington posted to Twitter.

In a call Wednesday between Abu Dhabi Crown Prince Mohamed bin Zayed Al Nahyan and U.S. Defense Secretary Lloyd Austin, Austin "underscored his unwavering support for the security and defense of UAE territory against all threats." The Pentagon has since declined to provide specifics about the UAE's request.

Abu Dhabi was also consulting with congressional gatekeepers on U.S. arms sales this week. The embassy said Al Otaiba met Wednesday with House Foreign Affairs Committee Chairman Gregory Meeks, D-N.Y.

Ahead of Senate Foreign Relations Committee Chairman Robert Menendez's meeting with Al Otaiba, Menendez said, "We'll see what their request is. I certainly recognize some of the challenges they're having."

Congressional aides said lawmakers have generally been open to Abu Dhabi's requests for weapons to defend against Houthi attacks, but Emirati officials are likely to face questions over the country's growing ties to China and accusations its forces have intervened in Libya's ongoing war.

U.S. officials would also have to consider the suitability and production schedules for the equipment Abu Dhabi is requesting, according to a Senate aide granted anonymity to talk about diplomatically sensitive arms sale talks. If the UAE is seeking Patriot missiles, there's reportedly an interceptor shortage fueled by Houthi drone and rocket attacks against Saudi Arabia.

"The Saudis are using up their Patriots at a good clip, and these things, you don't just pick them up at Walmart," the aide said. "The Emiratis could be asking for things very appropriately, but before anything comes from it and arrives in country, it could be years."

Gulf Arab states, as well as the U.S., U.N. experts and others, have previously accused Iran of supplying arms to the Houthis, a charge Tehran denies.

Bilal Saab, a former Pentagon official now at the Middle East Institute, said the Houthis' use of missiles suggests Iranian involvement, even after diplomatic talks in December between Iranian and Emirati officials in Tehran.

"Clearly those talks were ineffective," Saab said. "The very use of ballistic missiles signals to me that the Iranians knew about it, were on board or at least had a role."

President Joe Biden said Wednesday his administration, following the strikes, is considering restoring the Houthis to the U.S. list of international terrorist organizations.

Al Otaiba had urged the move, and the Emirati Embassy welcomed it in a statement that said, "Case is clear — launching ballistic and cruise missiles against civilian targets, sustaining aggression, diverting aid from Yemeni people."

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Russian and Syrian Fighters Fly Unprecedented Joint Patrol Along Syria's Border With Israel

Thomas Newdick | 24 January 2022

Source: The Drive | https://www.thedrive.com/the-war-zone/44005/russian-and-syrian-fighter-jets-execute-joint-patrol-along-syrias-border-with-israel

This second flight-test has proven the reliable performance of all the advanced technologies integrated into the system. Photo: PIB Press Release.

Russian and Syrian warplanes conducted joint patrols along Syria's borders today, launching what the Russian Ministry of Defense says will be a regular series of flights. Syrian fighter jets joined Russian fighters, strike aircraft, and radar planes, on a mission that took them partly on a provocative course that included skirting the Golan Heights, in what seems to have been a very deliberate signal to Israel, which occupies this strategically important region.

The start of a planned new series of joint air operations between Russia and Syria offers a significant boost to the Syrian Air Force.

The first joint air patrol mission of this kind to have been announced by the Russian Ministry of Defense involved Syrian Air Force MiG-23 Flogger and MiG-29 Fulcrum fighter jets, together with Russian Aerospace Forces Su-34 Fullback strike aircraft and Su-35 Flanker multirole fighters and A-50 Mainstay airborne early warning and control (AEW&C) aircraft. The much-depleted Syrian MiG-23 fleet, in particular, is only rarely seen in action, after years of action in the country's ongoing civil war, while the Syrian MiG-29s, despite their appearance, have been modestly upgraded and have seen more use of late. The Russian types have all been deployed to Syria regularly since September 2015.

According to the Russian Ministry of Defense, quoted by the TASS state-run news agency, the Russian aircraft departed their main hub at the recently expanded Khmeimim Air Base in Syria's western Latakia province, while the Syrian jets were operating from Seikal and Dumayr airfields outside Damascus.

Together, the aircraft flew along the Israeli-occupied Golan Heights, and over northern Syria, including the Euphrates River. The highly tense Golan Heights serves as the armistice line with Israel, which is also currently waging a campaign of airstrikes against targets in Syria, primarily related to suspected Iranian and Hezbollah positions.

"During the patrol mission, Syrian pilots controlled airspace and provided fighter cover, while Russian crews practiced attacks on ground targets," a statement from the Russian Ministry of Defense, quoted by the Interfax news agency, specified. The statement added that Syrian pilots practiced hitting targets with air-to-air missiles, while their Russian counterparts struck ground

targets at a training range in central Syria.

"The two countries' pilots developed skills for cooperation in various situations," the statement added. "These kinds of joint missions will now take place on a regular basis."

"Flights were carried out along the Golan Heights along the southern border of the Syrian Republic," Alexander, the commander of the Su-34 unit, told TV Zvezda, the Russian Ministry of Defense's official television station. "Today, for the first time, we flew in unified combat formations and established interaction with Syrian Arab Republic pilots. We understand each other perfectly."

Russian forces have been present in Syria since 2015 when Moscow launched its intervention in the country's civil war on behalf of President Bashar Al Assad. They have remained in action since then, primarily operating from Khmeimim, but also other bases in the country, including Qamishli Airport, in the northeast of Syria. Most recently, Tiyas Air Base (also known as T-4), in the central Homs governorate, has begun to receive additional Russian fighter jets, in the shape of MiG-29SMT Fulcrums, although it's unclear if they will remain here on a more permanent basis.

While Russian airpower continues to support Assad's forces, today's mission along the Golan Heights seems to have been intended to signal intent to Israel.

Although Israeli forces seized control of the Golan Heights during the 1973 Yom Kippur War, they withdrew from a buffer area as part of a U.N.-backed deal in 1974. The United Nations Disengagement Observer Force (UNDOF) had maintained forces in the area to monitor the ceasefire agreement, but those elements came under attack from ISIS terrorists in 2014 and a number of posts were abandoned.

Assad has since attempted to take back control of portions of the U.N.-maintained demilitarized zone, with Israel in the past protesting to the United Nations that Syrian forces had moved tanks, artillery, and other heavy weapons into the buffer area in violation of the ceasefire.

In September 2017, Israel reported downing an unmanned aircraft belonging to the Iranian-backed Lebanese militant group Hezbollah flying over the disputed Golan Heights. Two months later, an Israeli Patriot blew apart one of the Syrian regime's unmanned aerial vehicles in the same general area.

Israel shot down a Syrian Su-22 Fitter combat jet with a pair of Patriot surface-to-air missiles, along the border with Syria, in July 2018, reportedly after it flew more than a mile into Israeli territory near the Golan.

In 2019, then-President Donald Trump declared the United States the first country to recognize the Golan Heights as part of Israel. However, the 28 member states of the European Union, in turn, declared in turn that they do not recognize Israeli sovereignty, and the status of the area remains contested, with most of the international community considering the Golan to be Syrian territory under Israeli occupation.

Now, under President Joe Biden, the U.S. stance on the Golan is less clear, with Secretary of State Antony Blinken, for example, having noted last year that the territory is important for Israel's security, but stopping short of full recognition.

More recently, Israeli tanks reportedly fired warning shots along the Syrian border in the Golan Heights in response to what Israel said were several suspicious figures in the vicinity of an Israel Defense Forces unit there. The suspicious figures were manning "military posts," according to the Israeli military, and later fled into Syrian territory.

While we don't know where the future joint Russian-Syrian missions will take place, today's activity might indicate that Assad hopes that combining his forces with Russian airpower demonstrates resolve over the contested Golan Heights. On the other hand, Russia has so far proven resistant to actually taking action on behalf of Assad in the face of Israeli aggression.

Moscow did not come to Assad's aid with its air defenses in Syria after Israel allegedly attacked the port of Latakia recently, continuing the Russian policy of not fighting back against Israeli airstrikes. With that in mind, it's also possible that today's mission and any more to follow are intended primarily to reduce the tensions that very likely exist between Assad and Russia over this continued policy of inaction.

However, with Israeli Air Force fighter jets operating over Syria, the presence of joint Russian-Syrian patrols might at least give pause for thought for Israel, or at the very least hamper its ability to strike targets of opportunity, especially if joint missions by air defense fighters become a more regular feature of the conflict.

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Taiwan Air Force Stages Drill to Intercept Chinese Planes Amid Tensions

Fabian Hamacher and Ann Wang | 06 January 2022

Source: Router | https://www.reuters.com/world/china/taiwan-air-force-stages-drill-intercept-chinese-planes-amid-tensions-2022-01-05/

12 F-16V fighter jets perform an elephant walk during an annual New Year's drill in Chiayi, Taiwan, January 5, 2022. REUTERS/Ann Wang

CHIAYI, Taiwan, Jan 5 (Reuters) - Taiwan air force jets screamed into the sky on Wednesday in a drill simulating a war scenario, showing its combat readiness amid heightened military tensions with China, which claims the island as its own.

Before takeoff, flight crews at a base in the southern city of Chiayi - home to U.S.-made F-16 fighter jets that are frequently scrambled to intercept Chinese warplanes - rushed to ready aircraft as an alarm sounded.

The exercises were part of a three-day drill

to show Taiwan's battle readiness ahead of the Lunar New Year holiday at the end of this month.

Tensions across the sensitive Taiwan Strait have been rising in the past few years, with Taiwan complaining of repeated missions by China's air force near the democratic island.

Chinese military aircraft frequently fly into the southwestern part of its air defence identification zone (ADIZ), airspace around the island that Taiwan monitors and patrols.

"With the very high frequency of Communist planes entering our ADIZ, pilots from our wing are very experienced and have dealt with almost all types of their aircraft," Major Yen Hsiang-sheng told reporters, recalling a mission in which he was dispatched to intercept Chinese J-16 fighters late last year.

China has not ruled out using force to bring Taiwan under its control.

Taiwan has termed China's activities as "grey zone" warfare, designed to both wear out Taiwan's forces by making them repeatedly scramble, and also to test its responses.

In a new year message for China last week, Taiwan President Tsai Ing-wen said military conflict is not the answer. Beijing responded with a stern warning that if Taiwan crossed any red line it would lead to "profound catastrophe".

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Early Warning Systems First Suggested North Korean Missile Could Hit US, Causing Temporary Scramble

Katie Bo Lillis, Barbara Starr and Oren Liebermann | 14 January 2022

Source: CNN | https://edition.cnn.com/2022/01/13/politics/north-korean-missile-faa-grounded-planes/index.html

(CNN) - In the minutes after North Korea launched a ballistic missile around 7:30 a.m. local time on Tuesday, the US command responsible for protecting the American homeland from airborne threats raced to determine whether the missile might be capable of striking the United States -- and for a moment, took steps as if it was.

It was "ugly," one US lawmaker briefed on the launch said. Defense officials "didn't have a good feel for its capabilities" right away, this person added.

Initial telemetry readings -- which can be inaccurate and are often discarded as more data becomes available - suggested that the missile could pose a threat as far away as the Aleutian Islands off Alaska or the California coast, two sources familiar with the matter told CNN.

Within minutes, US Northern Command and the Northern American Aerospace Defense Command (NORAD) dismissed those initial readings and assessed that the missile posed no direct threat to the mainland of the United States. The test weapon -- which sources say was a less maneuverable version of a hypersonic glide vehicle designed to evade missile defenses

- splashed down harmlessly in the sea between China and Japan, thousands of miles away from threatening America.

But in those few moments of uncertainty, the situation escalated quickly enough that the Federal Aviation Administration, which is part of a routine interagency discussion whenever there is a missile launch of this kind, grounded some planes on the West Coast around 2:30 p.m. PST on Monday for about 15 minutes.

The grounding forced air traffic controllers to hold some aircraft on the ground, while briefly diverting others in the air, according to air traffic control recordings, but controllers were at a loss when asked to explain to pilots what had caused the grounding. Some controllers erroneously referred to it as a national ground stop, something which hasn't been seen since 9/11.

The question, now, is what sparked that initial burst of urgency -- and perhaps, why the FAA reacted the way that it did.

"What we're seeing here is just the normal process of coordination and communication out of which early on some decisions were made that probably didn't need to get made," Defense Department spokesman John Kirby told reporters on Thursday afternoon.

NORAD insists that it was the FAA's call to issue the ground stop and that it did not issue a warning or alert as a result of the North Korean missile launch.

"As a matter of precaution, the FAA temporarily paused departures at some airports along the West Coast," the FAA said in a statement on Tuesday. "The FAA regularly takes precautionary measures. We are reviewing the process around this ground stop as we do after all such events."

The FAA did not respond to CNN's multiple requests for comment on Thursday.

A US official said the ground stop was not communicated through the FAA's Air Traffic Control System Command Center, based in Warrenton, Virginia, and instead went straight to regional centers on the West Coast.

The launch on Tuesday was the second such launch by North Korea within the space of a week. But the first, last Thursday, was far less sophisticated, South Korean officials have said.

US officials are still conducting their assessment of the most recent test, but analysts who closely track North Korea's weapons development programs have identified the missile used on Tuesday as what is known as a "maneuverable reentry vehicle" -- still a hypersonic glide vehicle that can alter course after reentering the atmosphere but that has a limited range and maneuverability compared to more advanced systems.

"It's basically falling," said Jeffrey Lewis, a weapons expert and professor at the Middlebury Institute of International Studies. "It's falling with style."

Lewis said it's not unusual for detection systems such as radar or infra-red satellites to struggle to determine a missile's trajectory in the first moments after a launch.

"If it's a regular old ballistic missile, they can usually calculate that pretty well, but you have to wait for the engine to stop firing," he said. "So that's why you sometimes see mistakes, because you're trying to calculate it before the engine stops firing, and if you're at a funny angle, you might be able to see that it's going up but not what direction."

In any case, there is no question that the launch violated UN Security Council resolutions that prohibit North Korea from any ballistic missile activity. And arms control experts have continued to raise alarms that Pyongyang's weapons development program continues to pose a long-term threat to the United States and its allies.

US officials familiar with North Korea's weapons development programs say Pyongyang's efforts to develop hypersonic missiles is not a surprise -- North Korea has telegraphed its intent publicly -- even if some of the specific capabilities demonstrated by the missile launched on Tuesday were surprising. Those sources declined to specify what capabilities were unknown.

In January of last year, North Korea stated publicly that it had "finished research into developing warheads of different combat missions including the hypersonic gliding flight warheads for new-type ballistic rockets and was making preparations for their test manufacture."

Still, after years of high-profile diplomatic exchanges between former President Donald Trump and North Korean leader Kim Jong Un, the Biden administration has so far taken a relatively low-key approach to North Korea even as it has continued to condemn testing by Pyongyang.

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North Korea Launches Second Hypersonic Missile in Fiery Test

06 January 2022

Source: Money Conrol | https://www.moneycontrol.com/news/world/north-korea-launches-second-hypersonic-missile-in-fiery-test-7904881.html

North Korea fired a hypersonic ballistic missile this week that successfully hit a target, state news agency KCNA reported on Thursday, its second such test as the country pursues new military capabilities amid stalled denuclearisation talks.

The launch on Wednesday was the first by North Korea since October and was detected by several militaries in the region, drawing criticism from governments in the United States, South Korea, and Japan.

North Korea first tested a hypersonic missile in September, joining a race headed by major military powers to deploy the advanced weapons system.

Unlike ballistic missiles that fly into outer space before returning on steep trajectories, hypersonic weapons fly towards targets at lower

altitudes and can achieve more than five times the speed of sound – or about 6,200 km per hour (3,850 mph).

"The successive successes in the test launches in the hypersonic missile sector have strategic significance in that they hasten a task for modernizing strategic armed force of the state," the KCNA report said.

In Wednesday's test, the "hypersonic gliding warhead" detached from its rocket booster and manoeuvred 120 km (75 miles) laterally before it "precisely hit" a target 700 km (430 miles) away, KCNA reported.

The test also confirmed components such as flight control and its ability to operate in the winter, KCNA added.

The missile demonstrated its ability to combine "multi-step glide jump flight and strong lateral manoeuvring," KCNA said.

The launch on Wednesday was the first by North Korea since October and was detected by several militaries in the region, drawing criticism from governments in the United States, South Korea, and Japan.

While it has not tested nuclear bombs or long-range intercontinental ballistic missiles (ICBMs) since 2017, in recent years North Korea has developed and launched a range of more manoeuvrable missiles and warheads likely aimed at being able to overcome missile defences like those wielded by South Korea and the United States, analysts have said.

"My impression is that the North Koreans have identified hypersonic gliders as a potentially useful qualitative means to cope with missile defence," said Ankit Panda, a senior fellow at the U.S.-based Carnegie Endowment for International Peace.

New Missile

Hypersonic weapons are considered the next generation of arms that aim to rob adversaries of reaction time and traditional defeat mechanisms.

Photos of the missile used in Wednesday's test show what analysts said is a liquid-fueled ballistic missile with a conical-shaped Manoeuvrable Reentry Vehicle (MaRV) blasting off from a wheeled launch vehicle in a cloud of flame and smoke.

It is a different version than the weapon tested last year, and was first unveiled at a defence exhibition in Pyongyang in October, Panda said.

"They likely set up at least two separate development programs," he added. "One of these was the Hwasong-8, which was tested in September. This missile, which shares a few features in common with the Hwasong-8, is another."

After this week's launch was detected on Wednesday, the U.S. State Department said it violated multiple U.N. Security Council Resolutions and poses a threat to North Korea's neighbours and the international community. The department did not immediately respond to requests for comment on North Korea's report it had tested a hypersonic weapon.

North Korea's last missile launch was in October, when it says it fired a new short-range missile from a submarine.

That ballistic missile submarine has returned to the secure boat basin at the Sinpho South Shipyard, following a brief period of hull maintenance after that test, 38 North, a Washington-based programme that monitors North Korea, reported on Thursday.

Talks aimed at persuading North Korea to surrender its nuclear weapons and ballistic missile arsenal have been stalled since a series of summits between leader Kim Jong Un and then-U.S. President Donald Trump broke down with no agreement.

U.S. President Joe Biden's administration has said it is open to talking to North Korea, but Pyongyang has said American overtures are empty rhetoric without more substantive changes to "hostile policies" such as military drills and sanctions.

The latest test came just hours before South Korean President Moon Jae-in attended a groundbreaking ceremony for a rail line he hopes will eventually connect the divided Korean peninsula, casting doubts over his hopes for an eleventh-hour diplomatic breakthrough with North Korea before his five-year term ends in May.

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Red Flag- Nellis 22-1 Kicks Off With Allied Forces

Christie Vanover | 24 January 2022

Source: Dvids Hub | https://www.dvidshub.net/news/413330/red-flag-nellis-22-1-kicks-off-with-allied-forces

NELLIS AIR FORCE BASE, Nev. – Nearly 100 aircraft and 3,000 personnel have arrived at Nellis Air Force Base to participate in the first Red Flag exercise of 2022. Aimed at providing realistic training and increasing combat effectiveness, the exercise will run from Jan. 24 to Feb. 11.

"Red Flag-Nellis 22-1 is America's premier air combat exercise focused on readiness and partnering through Air Expeditionary Wing-led strike ops," said Col. Jared Hutchinson, 414th Combat Training Squadron commander. "In its 47th year of execution, participants will build confidence under fire and integrated leadership and warfighter culture that will lead to victorious coalition fights.

"They will learn from each other face-to-face, so we'll all be better prepared and ready when we meet again in another region of the world," he added.

With the 388th Fighter Wing from Hill Air Force Base, Utah, at the lead wing position, this iteration will include participants from the U.S. Air Force, Navy, Marines, Space Force, Air National Guard, U.S. Air Force Reserves, the United Kingdom (Royal Air Force) and Australia (Royal Australian Air Force).

Aircraft participating include the A-10, B-2,

B-52, E-3, E-7A, E-8, EA-18G, EC-130, F-15E, F-16C, F-22, F-35, FGR4, HC-130, KC-135, MH-60, MQ-9, RC-135 and RQ-4.

"Red Flag 22-1 is a unique exercise, because it demonstrates the most cutting edge-tactical integration of air power from the U.S. and her primary allies, the U.K. and Australia," said Hutchinson. "Each flag pushes the state of the art to a new level by building on the efforts of previous Red Flags. There are many new and emerging real-world tactical problems that will be presented for the first time to the allied force."

Brig. Gen. Michael Drowley, 57th Wing commander, welcomed participants during a pre-brief Jan. 21. He advised the units that the training they are about to receive has evolved over time and includes modern-day problem sets aimed to prepare them if they get the call to defend the nation.

During the exercise, red forces, led by the 57th Operations Group and supported by the Nevada Test and Training Range, will drive static, dynamic and adaptive threats, challenging participants.

"All eyes are on this Red Flag to see how you lead through the fog and friction of combat. Fight's on," said Drowley.

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What Happened to the Afghan Air Force?

James Cunningham and Joseph Windrem | 07 January, 2021

Source: Air University | https://www.airuniversity.af.edu/JIPA/Display/Article/2891279/what-happened-to-the-afghan-air-force/source/GovD/

As the Taliban rolled into Kabul on 15 August 2021 on motorcycles and in stolen Humvees, they clearly did not fear the one thing that had kept them at bay for years: air strikes. US forces had withdrawn; even "over-the-horizon" US air support had ceased—and the Afghan Air Force (AAF), a crucial part of a security force that the United States had spent two decades and $90 billion building and supporting, was nowhere in evidence. In fact, nearly 25 percent of all Afghan military aircraft were hundreds of miles away in Uzbekistan, Turkmenistan, and Iran, where their AAF pilots fled to escape the Taliban.

How did such a massive investment by the United States fail in such a key respect? And what lessons can be drawn from that failure?

Introduction

Since 2014, the Special Inspector General for Afghanistan Reconstruction (SIGAR) has had a program dedicated to identifying and preserving lessons from the US reconstruction experience in

Afghanistan. The head of SIGAR, John F. Sopko, created the program in response to requests from the many generals, ambassadors, and Afghans he met with on his visits to Afghanistan who were looking for big-picture assessments of what had and had not worked. To date, SIGAR's Lessons Learned Program has issued 13 reports covering a range of topics, from security-sector assistance to economic development to support for gender equality. These reports have identified more than 195 specific findings and lessons and made more than 146 recommendations to Congress, executive branch agencies, and the Afghan government. The following is based on SIGAR's body of work on US security-sector reconstruction efforts, but primarily the work found in two lessons learned reports: Reconstructing the Afghan National Defense and Security Forces (2017) and Divided Responsibility (2019).

The absence of the AAF in the final days before the Taliban takeover was not some 11th-hour disaster. It was the last event in a long chain of causality that SIGAR has been sounding alarms about for years. In Afghanistan, the United States tried to create a military force that was a mirror image of America's own—that is, ground forces that rely on overwhelming air superiority—without providing the Afghans with an air force that could maintain, train, and equip itself without US support.

The last straw came when US aircraft maintenance contractors left the country in May and June. Once that happened, "every aircraft that had battle damage or needed maintenance was grounded," a former Afghan National Army (ANA) senior officer told SIGAR in a recent interview. "In a matter of months, 60 percent of [the US-provided UH-60 Black Hawk helicopters] were grounded, with no alternative plan by the Afghan government or U.S. government to bring them back to life." Given that reality, the decision by many AAF pilots to fly their planes to neighboring countries appears to have been a salvage effort: they took some fellow fighters and their families with them and kept their aircraft out of Taliban hands.

Although no one foresaw the speed with which the Afghan government collapsed, SIGAR has issued numerous reports—audits, inspections, special projects, quarterly reports to Congress, and lessons learned reports—pointing out problems that strongly suggested the collapse of the Afghan National Defense and Security Forces (ANDSF) was a foreseeable tragedy. The story of the United States' unsuccessful attempt to create a self-sustaining air force in Afghanistan reflects the larger story of the US intervention in Afghanistan. Both were a complex mixture of calculated decisions, political pressure, bureaucratic inertia, and ad hoc decisions made by constantly changing military personnel who were never in the country long enough to build a lasting institutional memory. SIGAR was not the only agency noting problems: military observers and experts on Afghanistan did as well. In its regular reports to Congress, the Department of Defense (DOD) duly noted most of these problems, in detail. However, in keeping with the military's

"can-do" institutional culture, its top leaders kept their emphasis on progress and forward momentum. There was little incentive to weigh positive and negative information realistically—military careers are made by following orders, not demonstrating failure. To understand how the story unfolds, we begin with a brief history.

Background

In the first years of the US involvement in Afghanistan, the United States took it for granted that American forces would provide the airpower the Afghan military needed; with the Taliban routed, the thinking was, US air support was only a temporary need. When it became clear the Taliban were regrouping, the development of an Afghan air capability became a key component of the US exit strategy. If the ANA could keep a motivated insurgency at bay with the help of US airpower and medevac capabilities, then—in theory—training Afghan pilots to do the same would get American troops home.

In 2005, then-Secretary of Defense Donald Rumsfeld directed the US Army to formally rebuild an Afghan presidential airlift capability as part of the Afghan National Army Air Corps. By 2007, that had morphed into plans for an Afghan Air Corps of 7,000 members, to be carved out of the ANA, and responsibility for training had shifted from the US Army to the US Air Force. The goal: to "set the conditions for a fully independent and operationally capable" air corps to meet Afghanistan's security needs.

But what were those needs? From the beginning, US and Afghan views differed. "We are grateful for what America and the West are doing," Afghan Colonel Khei Mohammad said in 2007, "but we need to rebuild our air corps faster. . . . We should have jets, helicopters, and cargo planes, so that we can defend our borders ourselves." However, while Afghan military leaders seemed focused on air attack capabilities, Brig Gen Jay Lindell, USAF, was more interested in the mundane problem of logistics, citing "the immediate critical need . . . [for] air mobility capability."

Training Efforts and Acquistions

With those fundamental differences unresolved, the United States began work on training the fledgling air corps with around two dozen aircraft. By 2011, more than 30 coalition partners were participating in the AAF train-and-advise mission, and Afghan pilots hit several training milestones. Even so, the DOD noted the still-fledgling nature of the AAF, whose entire force was rated as "established but not operational." Only 59 of 145 planned aircraft had been delivered, and the training mission lacked 65 promised trainers. Afghans renewed their requests for fighter jets and attack helicopters, which the Bush administration denied.

That was to become a pattern: the United States provided equipment the US military wanted to give, not necessarily what the Afghans asked for. However justifiable any given equipping decision may have been, this policy had a long-term ramification: it kept the Afghan government from mastering the essential managerial role of

learning how to equip its own military.

Several SIGAR reports focused on questionable equipping decisions, and a 2019 SIGAR report said, "After 18 years . . . the Afghans do not have a formal, consistent role in the equipping process." As a result, the report found, "the Afghans currently have limited ownership and understanding of the equipping process." To develop that understanding, the report added, "the Afghans will need be able to play a larger role in the direction, execution, and tracking of their own equipment procurement, training contracts, and sustainment."

In retrospect, it seems clear that acquisition decisions by the US military might have benefited from more Afghan input. The grounded UH-60 Black Hawk helicopters mentioned previously by the former senior ANA officer are one example. At the start of the United States' involvement with the AAF, the force was using Mi-17 helicopters, the Russian-made workhorse used by the Afghan military since the Soviet occupation. Afghans were familiar with its repair and maintenance. In 2014, Russian forces invaded the Crimean Peninsula, to widespread international condemnations—and those tensions, combined with the increasing difficulty of getting spare parts for the Mi-17s, prompted the DOD's decision in 2016 to stop using Mi-17s and give the AAF something else.

That "something else" proved to be the UH-60 Black Hawk helicopter, made by Connecticut-based Sikorsky Aircraft. The control panel of the Mi-17 has dials and buttons; the UH-60 control panel is a wall-to-wall array of electronic readouts. The decision to supply state-of-the-art UH-60s instead of a simpler model meant a steep new learning curve for Afghan pilots, at a time when the number of US trainers was minimal. By the DOD's own estimates, the AAF would have been able to completely maintain a fleet of Mi-17 helicopters by 2019. With the introduction of the UH-60s, that best-case-scenario target date became 2030.

Yet two years before Congress approved the purchase of the UH-60s helicopters, SIGAR had warned in an audit that the AAF was not capable of even maintaining the aging aircraft it had. "The Afghans lacked the capacity—in both personnel numbers and expertise—to operate and maintain both the SMW's [Special Mission Wing] existing fleet of 30 aging aircraft and a planned fleet of 48 new aircraft costing a total of $771.8 million," the audit said. It was the first of many times over the ensuing years that SIGAR pointed out the Afghans' inability to maintain their own aircraft.

As a result, the AAF relied largely on contractors for its aircraft maintenance. This in itself was unremarkable; the US Air Force uses contractors for a significant amount of maintenance work, too. The problems with the AAF's near-total reliance included the fact that the overwhelming majority of contractors were from the United States, the increased need for maintenance caused by a small air force taxed with meeting the needs of large, scattered ground forces, and the scanty pool of Afghans who could even be trained in a country where two-thirds of the population are illiterate in their own language,

much less English.

Another problem emerged when young, literate pilots with English language skills proved to be more competent than older pilots, causing significant generational friction—especially when AAF leadership, respecting Afghan cultural norms, bypassed younger pilots to give older pilots flying assignments. Corruption also played a role. In theory, Afghan trainees were selected based on merit and test scores, but—as SIGAR noted in a 2019 lessons-learned report—US military officials acknowledged that Afghan officials often awarded coveted training slots based on patronage and family connections.

Other training issues originated within the US military bureaucracy. In 2013, the US Air Force authorized the purchase of four C-130s to supplement two the AAF already had. SIGAR raised questions the following year about the purchase, pointing out that the AAF was unable to maintain the C-130s it already had. The DOD's solution was to hire more contractors—who would, in theory, help train more Afghan maintenance crews. However, the contract did not spell out any training goals. Additional problems arose because of a separate DOD policy that said US air advisors could fly only in aircraft that had been assessed as airworthy by a US Federal Aviation Administration–credentialed mechanic—which had the effect of barring Afghans from working on the planes. There were, in short, any number of reasons why the process of building a truly self-sustaining air force from the ground up in Afghanistan was turning out to be agonizingly slow.

On its end, the United States had its own personnel problems. Decisions about equipping all branches of the Afghan military were often the result of inexperienced, untrained personnel who often lacked the expertise to identify more appropriate or cost-effective options. What is more, they were never in their jobs for long, due to the DOD policy of deploying its personnel on one-year rotations—creating a constant personnel turnover that became known as "the annual lobotomy." Not surprisingly, it was a system that produced bad decisions.

One notable example was the 2006 purchase of 20 refurbished G.222 fixed-wing aircraft for nearly half a billion dollars, which ended up being sold for scrap metal—an incident SIGAR first made inquiries about in 2014. The planes were bought under time pressure, via a sole-source contract, to use up procurement funds before the end of the 2008 fiscal year. This was despite warnings from within the US Air Force that a virtually identical model had proved unreliable and expensive to maintain when the United States had used it in the 1990s. One year of use in Afghanistan's high altitudes and punishing desert conditions proved nothing had changed: the G222s were still unreliable and expensive to maintain. The US Air Force tried to sell the planes, found no takers, and eventually sold them to an Afghan scrap metal dealer for $40,257.

However, such missteps did not in themselves doom the US effort in Afghanistan. The more

fundamental problem was the US military's proclivity for creating an Afghan military in its own image—and then failing to plan for the many challenges inherent in creating the air force that model required. A 2017 SIGAR lessons-learned report pointed out that, over time, Afghan officers became "addicted" to close air support—a dangerous dependency, considering the ticking clock and the still-developing AAF. As the report went on to say:

> *The tendency to train and assist the ANDSF with capabilities largely provided by the U.S. led-coalition extended beyond the provision of close air support. The ANA became accustomed to other combat enablers, such as medical evacuations, intelligence gathering, and reconnaissance capabilities, that were largely underdeveloped or nonexistent within the ANA at the time. In April 2010, for example, Defense Minister Wardak told NATO assembly members that the ANA faced shortcomings in air transport, mobility, reconnaissance, and firepower. This view was largely shared by other ANA officers, who viewed the ANA as dependent on foreign support because of its own lack of heavy equipment, close air support, and intelligence.*

The United States did produce one highly effective program for training Afghan pilots and maintenance crews: the A-29 training program, which began in January 2015 at Moody Air Force Base, Georgia. US Air Force personnel selected as trainers for the program were required to attend the US Air Force's Air Advisor Academy to get teaching certifications and were then assigned to three-year tours as part of the 81st Fighter Squadron, based at Moody. After conducting introductory training for their Afghan students in Georgia, trainers and trainees were deployed to Afghanistan, where the trainers provided additional mentoring and training. Following the advisor's tour, the advisor would return to Georgia to train the next class of Afghan students. Long tours and sustained mentoring, both in the United States and in Afghanistan, allowed trainers to enforce consistent standards and establish rapport with their students and their Afghan counterparts.

By 2018, Afghan A-29 pilots were hitting targets with 88-percent accuracy, according to the DOD's December report to Congress that year—proof that an incremental training approach and long-term relationships could produce superior results. And then the DOD ended the program. That was not a reflection on the A-29 training program but the collateral casualty of a different problem: an increasing number of Afghans going AWOL from an English language course offered at Lackland Air Force Base, Texas, which prompted the DOD to end all US-based training for Afghan pilots. (Meanwhile, the short-lived A-29 program became a template for similar programs subsequently being operated in Nigeria and Lebanon.)

All these issues were problems that could have been corrected, given enough time—but the AAF was running out of time. In February 2020,

the Trump administration announced that it had arrived at a peace agreement with the Taliban for a complete US pullout within 14 months, conditioned on the Taliban's promises not to let Afghanistan become a haven for terrorists and to enter talks with the Afghan government. The so-called Doha agreement had a devastating effect on morale among the Afghan military forces, former Afghan National Army General Sami Sadat wrote in a New York Times op-ed, by putting "an expiration date on American interests in the region."

Across Afghanistan, Taliban forces slowly but inexorably began consolidating their small pockets of fighters, demolishing roads and bridges, and expanding their areas of control. Then came the Covid-19 pandemic, one effect of which was to restrict the use of US air assets. The AAF, already struggling to run air support, resupply, and medevac missions for Afghan ground troops, was "very effective but very small," a former ANA official told SIGAR in a recent interview, and "the commandos were very effective, but now they were not getting the material support or the advisory or joint operation briefings that they used to get from the [United States]. Nonetheless, we have continued doing what we can." However, when scattered Afghan bases around the country began running out of ammunition and wounded soldiers began dying because of the lack of medical transport, the installations began falling to the Taliban. The result was an accelerating domino effect, ending with the 15 August flight of Afghan President Ashraf Ghani.

Conclusion

An air force can be a game changer. If by 2021, the Afghan military had possessed a highly effective and self-sustaining air force, the outcome could have been different. Building a military that is reliant on airpower and then failing to provide that airpower considerably narrows the field of possible outcomes.

Building an air force is not the same as training an army. A soldier can be given a weapon, trained to use it, and then supplied with ammo. The soldier may even be able to find more ammo or weapons on the battlefield. Aircraft have no such agency. They are expensive and technically complex, their pilots and mechanics must be literate and highly trained, and their logistical supply chains must be robust to ensure fuel and parts are always available. Unlike an army, which can be more adaptable and resilient, an air force will fall apart in weeks without constant support.

The fate of the AAF was hardly the sole factor in the collapse of Afghanistan. As SIGAR's work has shown, there were myriad reasons things went wrong, from corruption to mismanagement to lack of strategy and foresight. Moreover, there are more complex reasons—like morale and politics—that fall outside the purview of an oversight agency such as SIGAR.

However, one thing is clear: without political will and a long-term commitment—as we saw in Afghanistan—an air force cannot last long. It will be up to policy makers facing future contingencies to decide whether such an effort makes sense. Part

of that decision would require a more realistic understanding of the limits of political will—both our own and that of other nations.

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The project by start-up GalaxySpace aims to compete with the US company by offering high-speed internet services to remote areas.

Space

China to Start Building 5G Satellite Network to Challenge Elon Musk's Starlink

Stephen Chen | 21 January, 2022

Source: South China Morning Post | https://www.scmp.com/news/china/science/article/3164140/china-start-building-5g-satellite-network-challenge-elon-musks

The network will consist of around 1,000 satellites. Photo: Shutterstock

China will start building a network of a thousand satellites to provide 5G voverage within the next three month, according to state media reports.

The first batch of six low-cost, high-performance communication satellites have been produced, tested and arrived at an undisclosed launch site, according to a report by the state news agency Xinhua on Tuesday.

The company behind the project, Beijing-based start-up GalaxySpace, has said it wants to extend China's 5G coverage around the world and compete with Starlink, owned by Elon Musk's SpaceX, in the market for high-speed internet services in remote areas.

The Chinese constellation is small compared with Stralink, which already has around 2,000 satellites in orbit and plans to expand this to 42,000 when the network is complete.

Despite its smaller size, the 1,000-satellite Chinese network will be the first of its kind to use 5G technology.

Scientists involved in the project say this will ensure download speeds of more than 500 megabits per second with a low latency that will be a critical advantage in some demanding applications such as financial trading.

Starlink currently offers a download speed of about 110Mbps for civilian use and although it using a different technology to 5G, it has the potential to offer 6G services in future.

The constellation of satellites will be far smaller than Starlink's, but scientists involved in the project say it will offer speeds of up to 500 Mbps.

Beyond the commercial rivalry, Beijing gas identified Sratlink, which has signed multimillion dollar contracts with the US military, as a threat to China's national security.

In 2020, researchers with the Chinese National University of Defence Technology estimated that it could increase the average global satellite communication bandwidth available to the US military from 5Mbps to 500Mbps.

The researchers also warned that existing anti-satellite weapons technology would find it virtually impossible to destroy a constellation the size of Starlink.

Zhu Kaiding, a space engineer from the China Academy of Space Technology, wihc is working with GalaxySpace on the project, said the Chinese project was struggling to keep pace with Starlink, which according to Musk is producing six satellites a day.

Zhu did not disclose how quickly China was producing satellites, but in a paper published in domestic journal Aerospace Industry Management in October last year, he said the Starlin programme had forced a satellite assembly line in China to increase tis productivity by more than a third.

Zhu and colleagues have said that more than half the routine checks carried out at the launch site of high-frequency operations have been cancelled to save time.

The new satellite also use many components produced by private companies that have not previously been involved in Chinese space projects – a move that helps reduce the total hardware price of a high – speed internet satellite by more than 80 per cent.

Zhu said that the race against Starlink had put enormous pressure on China's space industry because "the technology is complex, the competition fierce, the deadlines tight and the workloads heavy."

It is likely that the number of civilian users of satellite internet service in China will be limited – most urban residents can access 5G through their phone and broadband services are available in most rural areas – so the most likely customers are overseas companies or the Chinese government

and military.

In early 2020, GalaxySpace launched an experimental satellite to see if these unprecedented measures would affect the satellite's performance, using terminals in site that ranged from China's densely populated east coast to remote mountainous areas in the west of the country.

One of the biggest concerns was bad weather, according to Li Jiancheng, a lead communication technology scientist with GalaxySpace.

Although Starlink warned its users that rain or cloud can effect internet speed or even cut off communications entirely, Li and colleagues found that the satellite could maintain download speeds of 80Mbps in the worst weather, they wrote in a paper published in Digital Communication World last year.

Two Chinese state-owned space contractors – the China Aerospace Science and Technology Corporation and China Aerospace Science and Industry Corporation – have also launched their own global service programmes known as Hongyan and Hongyun.

Although they are smaller in scale than Starlink – the hongyan constellation will include 324 satellites and Hongyun 156 – they will operate at different orbiting altitudes and frequencies to help China claim more of the diminishing resources in space, according to some scientists informed of these projects.

They say it is unlikely that China will launch a programme as big as the Stralink because two giant constellations in the lower orbit could significantly increase the risk of accidents.

Last year China complained to the United Nations that its space station had beed involved in two near misses with Starlink satellites and Musk has denied blocking space, claiming that there is room in near-earth orbit for "billions" of satellites.

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Space Force Just Launched Satellites Capable Of 'Inspecting' Enemy Satellites

Brett Tingley | 21 January, 2022

Source: The Drive | https://www.thedrive.com/the-war-zone/43980/space-force-just-launched-satellites-capable-of-inspecting-adversarys-satellites

Space Force launched two additional satellites today as part of its push for greater Space Domain Awareness, or SDA, in geosynchronous orbit some 22,000 miles away from Earth. The two satellites are part of the Geosynchronous Space Situational Awareness Program, or GSSAP, and will allow Space Force to not only locate and identify objects in this distant orbit, but also maneuver close to them in order to inspect them or assess their capabilities. The launch comes as Space Force leadership continues to sound the alarm about the risks posed to U.S. satellites in orbit.

The Northrop Grumman-built GSSAP-5 and GSSAP-6 were launched today at Cape Canaveral Space Force Station in Florida atop a United Launch Alliance (ULA) Atlas V 511 rocket. The first two GSSAP satellites were launched in 2014, with the second two following in 2016. Space Force has not released any details about how these two new GSSAP satellites might differ from the previous four, which were designed to operate near the belt of other geosynchronous satellites and maneuver close to them to conduct surveillance. A spokesperson for Space Systems Command stated this week that the new GGSAP satellites "will provide improved SDA data to the National Space Defense Center and other national users to enhance our ability to navigate freely and safely within the GEO belt."

Details about the GSSAP program remain murky. At the Mitchell Institute's Schriever Spacepower Forum this week, Chief of Space Operations Gen. Jay Raymond was asked if he could discuss any of the capabilities of the new pair of GSSAP satellites. In response, Raymond told attendees "When you look at the geosynchronous domain, it's a very large volume of space that you have to cover and this provides additional capacity for us."

Raymond elaborated somewhat, stating that the new satellites are part of Space Force's goal of being able to identify what capabilities other satellites in geosynchronous orbit may possess:

> *And so historically, the way we have surveilled or had awareness of a domain is we've, we've taken observations from radars are optical capabilities. And we've come up with an address and space, if you will, of objects. And we've been worried about making sure two things don't collide. That we can keep that domain safe for all which is critical. But it's not sufficient. If you move into a warfighting domain, you have to have more knowledge than just where something*

is you'd have to have some insights into what those capabilities are.

GSSAP-5 and GSSAP-6 were originally scheduled to be launched in 2020, and it is not known why the launch was delayed almost two years. The GSSAP program was originally highly classified and was only revealed to the public in 2014. While the exact capabilities of the satellites are not public, it's known that they are able to capture close-up images of other satellites in geosynchronous orbit. Former Commander of Air Force Space Command Gen. William Shelton (Ret.) told Aviation Week in 2014 that the satellites are designed to drift in and out of the geosynchronous belt collecting intelligence on specific targets.

Two new satellites launched as part of Space Force's push for more space domain awareness can get up close and personal with other objects in orbit.

The Air Force has previously used one of the satellites for Remote Proximity Operations (RPO), maneuvering close enough to inspect another Department of Defense satellite operated by the Navy that was experiencing a malfunction. The former head of Air Force Space Command, General John Hyten (Ret.), has previously said the satellites are capable of capturing some "truly eye-watering" imagery.

The Secure World Foundation (SWF), which "acts as a research body, convener and facilitator to promote key space security and other space-related topics," collected data that shows GSSAP satellites made close-in observations of eight foreign-owned satellites between 2016 and mid-2018. In their 2019 Global Counterspace Capabilities report, SWF quoted Russian sources who stated it is "very difficult to estimate the current and future position of the GSSAP satellite and the other object, creating difficulty in determining safe approaches and ascertaining the intent of the approach, which could lead to misperceptions and mistakes."

GSSAP is notably part of the "orbital warfare" end of Space Force, tasked with protecting and defending American space assets and deterring adversary threats in space. Space Force's General David Thompson, the service's second in command, said last year that U.S. satellites are under attack "every single day" from "reversible attacks" such as electronic warfare jamming, laser dazzling, and cyber attacks. Space Force is known to possess at least one offensive system, the Counter Communications System, or CCS, which reached operational capability in 2020. The exact nature of CCS is unknown, but it is believed to be a jamming system designed to interrupt transmissions sent by enemy satellites.

The few public descriptions of the GSSAP satellites and their capabilities would suggest that they are similar to the highly-maneuverable "inspector satellites" that have shadowed American satellites for years. Russian inspector satellites are known to be capable of firing projectiles in space, and Russia has conducted multiple on-orbit anti-satellite weapons tests. China has been launching satellites into geosynchronous orbit at an increasing rate, some of which have displayed anomalous behavior.

Given the adversary satellite capabilities that are known to the public, it's no wonder Space Force wants maneuverable sets of eyes way out at 22,000 miles from Earth to keep track of what's going on in geosynchronous orbit.

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ISRO Targets Gaganyaan Launch Before Independence Day, Chandrayaan 3 by Mid-2023

Anonna Dutt | 04 January, 2022

Source: Indian Express | https://indianexpress.com/article/technology/science/isro-targets-gaganyaan-launch-before-august-15-7704957/

ISRO Chairman K Sivan (Express photo by Anil Sharma/ File)

The Indian Space Research Organisation (ISRO), India's space agency, is targeting the launch of first of the two planned uncrewed flights under the Gaganyaan mission before Independence Day this year and the third lunar mission Chandrayaan-3 by "middle of the next year", said the chairperson Dr K Sivan on Monday.

"If you look at the immediate task at hand this year, we have many missions to execute. Some of these are launch of EOS-4 and EOS-6 on board PSLV. Launch of EOS-02 on board maiden flight of SSLV. Many test flights for Crew Escape System of Gaganyaan and Launch of the first unmanned mission of Gaganyaan. In addition, we also have Chandrayaan-03, Aditya Ll, XpoSat, IRNSS and technology demonstration missions with advanced indigenously developed technologies on-board," Sivan said in the letter encouraging the scientists at the organisation, posted on the agency's website.

There is a directive to launch the first unmanned mission before the 75th anniversary of India's independence (August 15, 2022) and all the stake-holders are putting their best effort to meet the schedule. I am sure that we will be able to meet this target, Sivan said in the letter.

The chairperson also gave updates on the most anticipated missions. "Chandrayaan-3 design changes incorporating and testing has seen huge progress. The mission could be launched by middle of next year," he said.

The launch of the three earth observation satellites – EOS-02, EOS-04, and EOS-06 have been delayed for several months now. All big-ticket scientific missions, including India's first solar mission Aditya-L1, which were to take place in 2021 were pushed when the launch schedule was revised after the second wave of the pandemic.

The chairperson also gave some updates. "Chandrayaan-3 design changes incorporating and testing has seen huge progress. The mission could be launched by middle of next year," he said.

"All indicators point towards the next imminent wave. All of us have to prepared and protect ourselves both at the personnel level as well as at the institutional level to safeguard the ongoing programmes and activities," he said in his message.

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Global Aerospace Industry

Strengthening Turkish Policy on Drone Exports

Alper Coskun | 18 January, 2022

Source: Cambrigie Endowment for International Peace | https://carnegieendowment.org/2022/01/18/strengthening-turkish-policy-on-drone-exports-pub-86183

Drones are quickly becoming the weapon of choice for many states and, worryingly, even for nonstate actors. They are relatively cheap and have proven to be very effective both in offensive and defensive operations. Turkey has been capitalizing on the noteworthy performance of its domestically produced drones in operational theaters ranging from Syria and Libya to the South Caucasus as Ankara seeks to steadily increase the number of drones it sells to other countries.

But this success has come at a price—Turkey is drawing international attention, and at times attracting criticism, over its drone export policies. The latest example was in December 2021 when the United States reportedly expressed humanitarian concerns over the use of Turkish drones in Ethiopia, where conflict between the government and fighters in the region of Tigray continues with severe implications for the civilian population. According to unofficial reports, Turkey brushed off this criticism by highlighting its engagement with all parties involved to help resolve the conflict and pointing out that Ankara attaches humanitarian provisions to its arms sales.

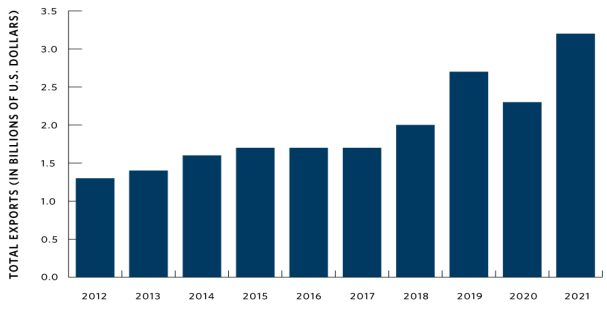
Simply dismissing such criticism is an inadequate approach for the Turkish government on this growing issue. Turkey needs to take concrete steps to consolidate its image as a responsible drone exporter in a manner that strengthens its prospects in a competitive market. It can do so first and foremost by being more transparent about its drone transactions. Doing so would help preclude speculation about Turkey's actions, and such a step can be complemented by due diligence measures such as strict adherence to relevant multilateral export control regimes and the formulation of a national code of conduct with principles to guide drone transfer policies. Turkey can go even further by invigorating debate among NATO allies on drone technologies and warfare.

Turkish Drones and a Growing Defense Industry

The global demand for both military and civilian applications of drones is rising. Some forecasts envisage that the market for military drones will grow from nearly $11.3 billion in 2021 to about $26.1 billion in 2028. The expanded use of drones for tasks ranging from intelligence gathering and surveillance to border management, as well as their flexible utility in counterterrorism and combat operations, is expected to fuel this demand. The successful integration of advancements in data management and artificial intelligence into drone technologies, described as a "renaissance" in the sector, is making this trend even more potent. Turkey has its eyes on this market and is trying to stay ahead by introducing new-generation drones with advanced capabilities that harness these developments.

The wide array of drones that Turkish manufacturers have developed has become the face of Turkey's growing national defense industry. The Turkish arms exports sector, which had been traditionally driven by small weapons and armored personnel carriers, has now diversified to include drones, missiles, frigates, and other high-end weapons systems, with prospects for submarine sales developing on the horizon. Consequently, Turkey's defense and aerospace equipment exports have more than doubled since 2012, exceeding $3 billion in 2021 (see figure 1). According to a December 2020 report from the Stockholm International Peace Research Institute, Turkey jumped up six spots on average in global rankings of arms exporters, landing just outside the top dozen countries from 2015 to 2019 after coming in at nineteenth over the previous five years.

FIGURE 1
Turkey's Burgeoning Defense and Aerospace Export Sector



Source: Turkish Exporters' Assembly, "Export Figures," 2012–2021, https://tim.org.tr/tr/ihracat-rakamlari.

Note: These figures are rounded to the nearest tenth. In most of the online data sets, the figures are listed under the category "savunma ve havacilik sanayii," or defense and aerospace industry.

This upward trend has become a source of pride in Turkey particularly against the backdrop of Ankara's deteriorating relations with its allies and traditional defense industry partners in the West, such as the United States. Turkey's ruling party, the Justice and Development Party (AKP), often uses this talking point for domestic consumption and to showcase what it touts as a remarkable success story. This trend is presented as proof of Turkey's unstoppable rise, despite what those in government circles like to pointedly describe as relentless disruptive efforts orchestrated by outside forces—an argument that gets some traction internally but fails to impress observers outside of Turkey.

At times, the narrative around this trend is also burdened by exaggerated acts of propaganda. A blatant example of this is a short film named "Decoded: Turkey's Drone Power," which was prepared in English by an international news channel called TRT World run by the national broadcasting company, the Turkish Radio and Television Corporation. The film was aired after the 2020 war in Nagorno-Karabakh between Azerbaijan and Armenia. The effects of Turkish drones in the forty-four-day conflict in the South Caucasus were aggrandized in this program under the chyron display: "Turkish drone power is heating up frozen conflicts." This careless slogan was nothing short of self-incriminating for Turkey and did not contribute to its image as a force for good.

Populist rhetoric of this nature conveniently overlooks various lingering vulnerabilities in Turkey's defense industry related to a continuing reliance on foreign technologies for certain components. And while this is at times a debilitating nuisance, it is also clear that Turkey has made considerable headway in developing its national defense industrial base with good prospects for the future.

A Boomerang Effect

Selling weapons is a lucrative, yet risky, business. Source countries can suddenly be drawn into the limelight, facing a host of difficult questions, such as what level of scrutiny they employ in exporting arms.

Turkey experienced this boomerang effect after Ukraine used a Turkish-made drone on October 26, 2021, to suppress a howitzer artillery targeting its forces. Ukrainian officials announced that they had done so after repeated shelling from the howitzer had claimed the life of one Ukrainian serviceman and injured another. Ukrainian President Volodymyr Zelensky said it was an act of self-defense that came after multiple Ukrainian warnings had been disregarded. He was fending off Russian criticism, as well as concerns expressed by Germany and France.

Turkey should strive to balance its status as a major exporter of drones with careful adherence to best practices and norms on arms sales and export controls.

An indignant Russia called on the Swedish chairperson of the Organization for Security and Cooperation in Europe to react to what it described as an open violation of the Minsk agreements, which were crafted to bring an end to the conflict. Meanwhile, Russian presidential spokesperson Dmitry Peskov took aim at Turkey and said that Moscow had previously shared its concerns with Ankara over the sale of the drones to Ukraine. Peskov bitterly concluded that the attack had validated the Kremlin's worries over the destabilizing effects of these weapons in the region.

Turkish Foreign Minister Mevlüt Çavuşoğlu rejected this criticism. He argued, "the drones may have been manufactured in Turkey but after . . . [they were sold], they belong to Ukraine. They cannot be referred [to] as Turkish weapons." He went on to say that Ukraine "should stop mentioning (Turkey's) name." This was a peculiar line of defense. More importantly, it contained several pitfalls for Turkey.

First, while it's true that the drone in question belongs to Ukraine and that Kyiv alone has discretion over its use, the proposition that suppliers can wash their hands of any responsibility after an arms sale is another matter. This interpretation would contradict the spirit of responsible behavior underlying export control mechanisms that Turkey is a party to and professes to abide by. Moreover, for years Turkey has gone on the record to criticize others, including its allies, when weapons produced in their countries have somehow turned up in the hands of the Kurdistan Workers' Party (PKK), which is listed as a terrorist organization in Turkey, the EU, and the United States. As a country that has consistently pointed fingers at others like that, Turkey needs to be more careful about recklessly trying to deflect blame from itself.

Second, there is the matter of timing. For some time now, Turkey has been perceived as having assumed a more militarized posture in its foreign policy. Among other things, this has led to increasing scrutiny of Ankara's use of drones,

as well as of the degree of careful judgment it exercises while exporting them. With so many eyes on Turkish drones, Ankara's rhetoric matters more than ever. Casual dismissals of responsibility will not carry much weight and will most certainly fall short of shielding Ankara from skepticism over its policies and intentions.

Third, ducking criticism by coldly pointing at Ukraine, an emerging strategic partner for Turkey in defense industry cooperation, was simply not prudent. The optics of this decision were negative and may have raised concerns in Ukraine over the resilience of its emerging partnership with Turkey.

Two conclusions can be drawn from this picture. First, senior Turkish officials should be better prepared for contingencies involving the use of Turkish drones by third countries. More broadly, Ankara needs to concentrate on its narrative and practices surrounding drone sales by not simply highlighting their operational worthiness but also addressing what degree of due diligence Turkey employs in exporting them. Implementing a well-structured policy framework that is guided by respect for international law and supported by consistent public messaging would strengthen Turkey's hand against criticism. Perhaps even more importantly for Ankara, such an approach could help dispel any stigma about its drone exports, thus protecting and advancing the reputation and appeal of Turkey's defense industry in general.

Setting The Right Standard

Turkey's success in developing drone technologies in recent years is overwhelmingly seen both in official circles and among the wider public in Turkey as the result of an uphill struggle, including against the country's closest allies who have not been forthcoming on defense industry cooperation or technology sharing in general. This perception has created a certain disillusionment in Turkey toward its traditional Western partners. It has also led to an accompanying sense of technonationalism, enhanced self-confidence, and a strong reflex to jealously guard Turkey's technological achievements and know-how.

Turkey's aspiration to establish itself as a drone power and the interest it has generated among an ever-growing number of potential buyers present Ankara with a conundrum: how can it retain the image of a responsible international actor in terms of its policy on drone transfers to third countries, without inhibiting its competitive edge in a demanding market?

This is not a challenge unique to Turkey. Currently, there is no dedicated international framework that sets global norms for the sale and transfer of drones. Former U.S. president Barack Obama's team made some efforts during his administration, including through the introduction of a national policy in 2015 that reinforced U.S. obligations under the Missile Technology Control Regime (MTCR). The MTCR entails a "strong presumption of denial" in the sharing of missile technologies based on categories related to range and payload. But efforts aimed at shaping an

international framework for drone sales proved to be fruitless, and meanwhile the Obama-era policy subsequently was relaxed in 2019 under former president Donald Trump to facilitate the export of drones by U.S. companies. There are reports that President Joe Biden's administration is conducting a review of arms control policies, with the idea of making a connection between arms sales and human rights, while at the same time highlighting the importance of promoting transfers that align with the interests of the United States.

It wouldn't be realistic to expect Turkey to employ self-restraint in its drone sales in a way that unfairly disadvantages it against other suppliers. Yet some thinking on how to ensure the responsible and lawful use of Turkish drones could help build a credible image around Turkey's burgeoning technological achievements and at the same time add to their appeal.

The Turkish government should take four steps: increase transparency, abide by export controls, formulate a code of conduct, and spark debate among the members of NATO.

Turkey's readiness to take such a step would be very timely in the run-up to the upcoming NATO summit, which will take place in late June 2022 in Madrid, Spain. Turkey's willingness to spur a conversation among NATO allies on drones would be particularly apt given that the role of technology and automated weapons systems in modern warfare features prominently as a topic in ongoing debates within NATO, including around the formulation of a new strategic concept. NATO's new strategic concept will guide the alliance into an era in which, according to Secretary General Jens Stoltenberg, wars will be "defined by bytes and big data as much as by bullets and battleships."

Such an initiative would carry strong appeal for Turkey's NATO partners given Ankara's recent operational experiences with different types of drones, but it also would constitute a meaningful sign of Turkey's desire to work closely with its allies. By extension, after the recent Turkish request to purchase forty U.S. F-16 fighter jets and twice as many modernization kits for some older planes, this step would also reaffirm Turkey's readiness to stay the course in its relations with its traditional Western partners.

Conclusion

Turkish drones have made a name for themselves in the past couple of years, and the prospects for this trend to continue are favorable, as is the likelihood that Turkey can expand its defense industrial base and export opportunities. The start of such an upward trajectory is the right moment for Turkey to focus internally on strengthening and solidifying the right domestic policy culture and on building a sound international reputation for its arms transfer policies.

Turkey's ability to strike the right balance in the tug of war between ethical and commercial considerations that is inherent to arms sales will shape its developing image as a weapons supplier. This challenge has already manifested in the increasing use of Turkish drones by third

countries. Turkey should draw the right lessons from these experiences: even as Ankara pursues opportunities to expand its share in a growing market, it should concurrently leverage the momentum it has gained to bolster Turkey's standing as a responsible international actor and principled NATO ally. These two objectives are not mutually exclusive.

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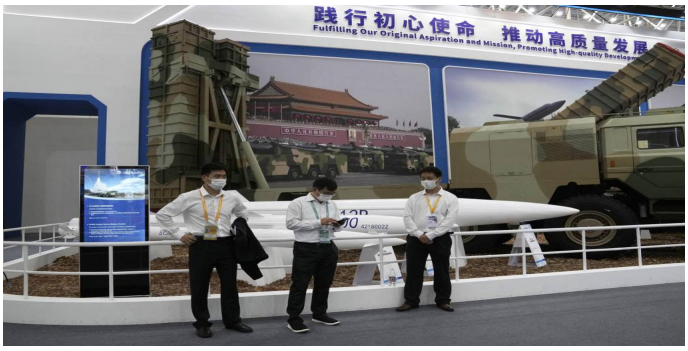
US Hits Chinese Defense Companies With Sanctions

21 January, 2022

Source: Defence News | https://www.defensenews.com/industry/2022/01/21/us-hits-chinese-defense-companies-with-sanctions/



Workers wearing masks stand near missiles produced by China Aerospace Science and Industry Corp. are displayed during Airshow China 2021 in Zhuhai. (Ng Han Guan/AP)

BEIJING — China on Friday criticized Washington for imposing sanctions on Chinese companies the U.S. says exported missile technology, and accused the United States of hypocrisy for selling nuclear-capable cruise missiles.

The United States announced penalties on three companies it said were engaged in unspecified "missile technology proliferation activities." It said they were barred from U.S. markets and from obtaining technology that can be used to make weapons.

The penalties apply to China Aerospace Science and Technology Corp. First Academy; China Aerospace Science and Industry Corp. Fourth Academy; and Poly Technologies Inc. and their subsidiaries.

China Aerospace Science and Industry

Corporation was ranked as the 11th largest defense company in the world on Defense News' Top 100 list. China Aerospace Science and Technology Corporation was ranked at 18th place.

"This is a typical hegemonic action. China strongly deplores and firmly opposes it," said Foreign Affairs Ministry spokesperson Zhao Lijian. "China urges the United States to immediately correct its mistakes, revoke the relevant sanctions and stop suppressing Chinese enterprises and smearing China."

China accounted for about 5% of global weapons exports in 2016-2020, according to the Stockholm International Peace Research Institute. The United States was the top global exporter, accounting for 37% of the total in 2016-2020.

Cruise missiles and long-range ballistic missiles are regarded as among China's strengths in weapons technology.

Zhao defended Beijing's controls on weapons exports. He said China opposes proliferation of weapons of mass destruction and strictly controls exports of missiles.

"Normal cooperation between China and relevant countries doesn't violate any international law and doesn't involve proliferation" of weapons of mass destruction, Zhao said.

Zhao pointed to U.S. plans to sell Australia's government Tomahawk cruise missiles capable of carrying nuclear warheads.

"The United States has overtly pursued double standards," Zhao said.

Multi-Orbit Constellation Startup Mangata Networks Raises $33 Million

Park Si-soo | 12 January, 2022

Source: Science News | https://spacenews.com/multi-orbit-constellation-startup-mangata-networks-raises-33-million/

Mangata plans a network of 791 communications satellites split between medium and highly elliptical Earth orbits. Credit: Mangata Networks

SEOUL, South Korea — U.S.-based startup Mangata Networks has raised $33 million from an international mix of investors for its multi-orbit connectivity constellation plans.

The Series A funding round was led by Playground Global, the U.S. venture capital firm which previously led Relativity Space's $35 million Series B round in 2018.

Other participants include U.S.-based early-stage investors MetaVC Partners and Promus Ventures, Singapore's sovereign wealth fund Temasek, Scotland's national economic development agency Scottish Enterprise and South Korean telco KT's satcoms provider KTSat, Mangata said in a Jan. 11 statement.

The startup did not disclose how much investment each investor made.

"We are out to change the world, and that requires visionary investors and partners,"

Mangata CEO Brian Holz said in the statement.

"These investors, whose intercontinental representation reflects our own global mission, are championing a new evolution in human connectivity."

Holz is a former CEO of OneWeb Satellites, the satellite manufacturing joint venture owned by Airbus and constellation operator OneWeb.

Mangata intends to use the proceeds to support plans for a constellation of 791 satellites spread across medium Earth orbit (MEO) and highly elliptical orbits (HEO).

The Phoenix, Arizona-based venture said it will start deploying ground-based networks as early as 2023, and plans an initial launch of eight HEO satellites to begin partial services in the Northern Hemisphere in 2024.

Holz told SpaceNews in 2020 that another 24 satellites will be launched in 2024 or 2025 to MEO, with later satellite batches added every 12 to 18 months.

Mangata received its first seed funding in 2020 from Bellevue-based Intellectual Ventures' Invention Science Fund, backed by Microsoft co-founder Bill Gates.

KTSat participated in the latest funding round to "provide better telecommunications and broadcasting services to customers at home and abroad," KTSat spokesperson Kim Eun-woo said.

"We have provided services using satellites in geostationary orbit," Kim told SpaceNews. "We made the investment, expecting that our services will be more stable and reliable services when we do business using satellites in multiple orbits."

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US F-18 Fighter Op-Demo in Goa for INS Vikrant in April-May

Shishir Gupta | 12 January, 2022

Source: Hindustan Times | https://www.hindustantimes.com/india-news/us-f-18-fighter-op-demo-in-goa-for-ins-vikrant-in-aprilmay-101641963107693.html

A fully loaded F-18 Super Hornet.

US defence major Boeing is planning an operational demonstration of F-18 Super Hornet carrier-based fighter at the shore-based test facility (SBTF) at INS Hansa in Goa in April-May this year as a possible contender for Indian Navy's sole aircraft carrier INS Vikramaditya and soon to be commissioned INS Vikrant. Both the Indian aircraft carriers use ski-jump to launch the fighters with arrested recovery through the net.

According to officials in knowledge of the matter in Washington and in New Delhi, the US Navy conducted ski-jump trials of F-18 fighter at Naval Air Station Patuxent River in Maryland in US or Pax river in December 2020 but the Indian Navy team could not attend the demonstration due to travel restrictions on account of the coronavirus pandemic. However, the US Navy shared extensive data of the ski jump trials with

the Indian Navy. A year later in December 2021, both the US Navy and the aircraft manufacturer did a site inspection of SBTF at INS Hansa in the presence of Indian Navy officials.

While presently the operational demonstration of Rafale-Marine is on at the INS Hansa as the other option for Indian aircraft carriers, both the twin engine aircraft are virtually of the same later 1990s vintage and of the same 4.5 generation.

Even as the Indian Navy will be evaluating both the aircraft, the F-18 is a two seater fighter, which is more suitable to carrier based operations for better orientation at sea. Rafale-M is a single seater fighter, while it has a two seater trainer but that can only be operated from the shore.

The other important factor that weighs in favour of the F-18 is that it can fit the INS Vikramaditya or INS Vikrant lift with folded wings without compromising on its operational readiness.

In case of Rafale-M the fighter will only fit to carrier lift after the wing tips of the aircraft are removed as the wings cannot be folded and the span is more than that of a folded F-18 fighter.

Aviation experts says that an adapter platform will have to be fitted for F-18 Super Hornet as it allows faster movement of jets from lower deck to deck under combat and high seas condition.

Although both France and US are close allies of India, the Modi government will also take into account the license, maintenance and spare parts issues as it cannot afford to be caught on the wrong foot in a rapidly changing security environment.

Under no circumstances, the Modi government will allow India's strategic autonomy and operational readiness to be compromised.

The other important factor that weighs in favour of the F-18 is that it can fit the INS Vikramaditya or INS Vikrant lift with folded wings without compromising on its operational readiness.

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Nepal Grounds Six Made-in-China Planes, Calls them Liability India's Aerospace Industry

05 January, 2022

Source: WION News | https://www.wionews.com/south-asia/nepal-grounds-six-made-in-china-planes-calls-them-liability-442288

(Image: Saloni Murarka) These planes provided by China are proving to be a headache for Nepal Photograph:(WION).

The words 'Made in China' have negative connotations in India as they often come to represent substandard, cheap products that do not last long and are often not worth the price. Nepal Airlines is finding this out the hard way.

The airlines has grounded six Chinese-made aircrafts saying that it is proving to be unaffordable to fly them. China is known to supply sub-standard equipment that requires heavy maintenance.

Nepal Airlines has repeatedly said that the Chinese-made planes were causing heavy losses ever since they were acquired between 2014 and 2018, and that it wants to remove them to stop further losses.

In 2020, board members of Nepal Airlines took the decision to ground the planes which came six years after the first batch landed in Kathmandu.

In total, there were six Chinese aircraft— 2 MA60 and 4 Y12E. One each were given to Nepal in grant. Nepal bought four in a government-to-government agreement. These included 1 MA60 and 3 Y12E, however, Nepal lost one Y12E in an accident in 2018

One of the Nepal Airlines official told WION that functioning of these aircrafts 'is and will not be profitable for Nepal'.

"We have been facing technical problems in functioning of these aircrafts. The spare parts are not easily available and repairing aircrafts is expensive and time taking. To run these planes, pilots with specific skills are required which we are short of. There are pilots in China but due to language barrier training pilots in Nepal is not possible," the official who wished to remain anonymous said.

"We did approach China for help but nothing has been initiated from their side yet. The board of directors of Nepal Airlines hold meeting on a daily basis to discuss on training Nepalese pilots but we are yet to take a decision on that," the source added.

When the deal was signed, Nepal Airlines Corporation did not have any pilots trained to fly the Chinese aircraft. Six years later, situation remains the same.

"It is a different aircraft which requires different training. Being a rare aircraft, there is a small-scale production of spare parts. The warranty period of many spare parts of these aircrafts have expired. Functioning of these aircrafts is and will not be profitable for us but still we are trying to put one aircraft in use as we are responsible to provide service to Nepalese people."

Nepal's finance ministry owns the planes which are operated by Nepal Airlines.

Nepal Airlines had bought these planes on loan. Since then, the carrier has been struggling to make payments, especially since these aircrafts have not been fully utilized.

As per the deal, the Nepali government has to pay the Chinese side an annual interest rate of 1.5 per cent and a service charge and management expenses amounting to 0.4% of the overall loan amount taken by the Ministry of Finance. The ministry then charges the Nepali carrier 8% annual interest on the amount of the disbursed loan.

Another official of Nepal Airlines informed WION, the carrier is supposed to pay the loan of US $35.1 million to the Ministry of Finance.

China delivered these aircraft from 2014 to 2018 but did nothing to help Nepal in capacity building.

Another official of Nepal Airlines told WION,

if planes are not operating then why should the corporation pay the loan.

In November 2011, when the sale for the aircraft began, technical teams from both Bangladesh and Nepal had visited China to inspect the MA60s and Y12s.

While Bangladesh had deemed the aircraft "not suitable", Nepal went ahead and signed an agreement with the Aviation Industry Corporation of China (AVIC) to procure six aircraft.

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Israel Inks $3 Billion Deal for KC-46 Tankers, CH-53 Helos

Seth J. Frantzman | 05 January, 2022

Source: Defence News | https://www.defensenews.com/air/2022/01/04/israel-inks-3-billion-deal-for-kc-46-tankers-ch-53-helos/

An artist rendering shows a CH-53K helicopter for the Israeli Air Force. (Courtesy of Sikorsky)

JERUSALEM — Israel's Defense Ministry has agreed to purchase two Boeing KC-46A tankers and 12 Lockheed Martin CH-53K helicopters in a long-expected deal.

"These procurement agreements are significant milestones in the [Israel Defense Forces'] buildup processes. We continue to strengthen our capabilities and to change and adapt our Air Force to face future challenges both near and far," Israeli Defense Minister Benny Gantz said when then Dec. 30 agreement was signed.

The KC-46 deal is worth about $1.1 billion, and the helicopter deal is worth another $2 billion. The agreement includes an option for six more helicopters, the ministry said, adding that the first will arrive by 2026. It's unclear when the KC-46s will arrive, and the ministry did not provide a timeline.

Israel has been working on a KC-46 deal for years and has sought to acquire new helicopters. The helicopter deal was cleared by the U.S. State Department in July 2021.

Both aircraft are needed to replace Israel's aging fleet. The country has undergone had several elections since 2018, and the lack of a stable government postponed some procurement efforts until early last year.

In February 2021, Israel agreed to a procurement program for two KC-46As with the signing of a letter of offer and acceptance. At the time, Israel said it would buy more F-35 Joint Strike Fighters and heavy-lift helicopters to replace its CH-53 Yasur helicopters. The procurement programs were conducted in coordination with the U.S. military channels, using the Foreign Military Financing program, the ministry said at the time.

"We will continue to work to complete the agreements that will enable the IDF to fulfill its purpose and to move forward with the missions facing us in the various arenas, near and far, at

sea, in the air, on land and in cyberspace," Gantz had said in February.

Since that announcement nearly a year ago, reports indicated Israel sought to speed up delivery of the tankers, with the slow pace of the deal a topic of concern in Jerusalem.

Israel says the latest aircraft procurements are part of a larger program "undertaken by the Ministry of Defense together with the IDF over the last year and a half, with the aim of strengthening the IDF's capabilities, force buildup and preparedness to face existing and future threats." This will include more F-35s as well as the refueling aircraft, the helicopters and munitions.

Israel has also said it wants more air defense systems and "new marine and land platforms as well as cyber systems." Some of these would be locally procured.

Israel has a multilayered air defense system consisting of Iron Dome, David's Sling and Arrow, programs supported by the U.S. and involving close cooperation with the U.S. Missile Defense Agency. Israel is also outfitting its new Sa'ar 6 corvettes and working on a future armored fighting vehicle.

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Indian Aerospace Industry

In First BrahMos Missile Export Order, Philippines Approves $374-Million Contract

Dinakar Peri | 14 January 2022

Source: The Hindu | https://www.thehindu.com/news/national/in-the-first-brahmos-missile-export-order-philippines-approves-374-mn-contract/article38272238.ece

A file picture of BrahMos, supersonic cruise missile successfully test-fired as part of service life extension program, from the Integrated Test Range (ITR), in Balasore. | Photo Credit: PTI

In the first export order for the BrahMos supersonic cruise missile system, Philippines has approved a $374.96 million contract for the purchase of shore based anti-ship variant of the missile from India, while discussions are ongoing with few other South East Asian counties. Secretary of National Defence of Philippines, Delfin Lorenzana has signed the 'Notice of award' for the purchase, the contract for which is expected to be signed very soon.

"As head of procuring entity (HOPE), I recently signed the Notice of Award for the Philippine Navy shore-based anti-ship missile acquisition project. Negotiated with the Government of India, it includes the delivery of three batteries,

training for operators and maintainers as well as the necessary Integrated Logistics Support (ILS) package," Mr. Lorenzana said on social media. Conceptualised as early as 2017, the Office of the President approved its inclusion in the Horizon 2 Priority Projects in 2020, he stated.

The coastal defence regiment of the Philippine Marines will be the primary employer of this modern strategic defense capability of the Armed Forces of the Philippines, Mr. Lorenzana added.

While Philippines had raised a unit sometime to operate the missile system, the contract was delayed by couple of years due to the COVID pandemic and budgetary constraints.

The Department of National Defence of Philippines, their equivalent of Ministry of Defence, too confirmed the notification and a copy of the notice of award signed by Mr. Lorenzana on December 31, 2021 was posted on the official website.

"This is to inform you that the proposal of BrahMos Aerospace Private Ltd. For the shore based anti-ship missile system acquisition project for the Philippine Navy, with a corresponding price proposal in the amount of $374,962,800 is hereby accepted," the letter stated. "You are hereby directed to provide, within 10 calendar days from receipt of this notice, the performance security in the form and amount stipulated in the terms of reference," it added.

Discussions underway

As reported by The Hindu earlier, there is interest for acquiring BrahMos missiles from several countries and negotiations are in advanced stages with Indonesia and Thailand.

Discussions with Indonesia are in fairly advanced stage, a defence official said. The sale of BrahMos was also on top of the agenda during the visit of the Indonesian Defence Minister Prabowo Subianto to New Delhi in July 2020, another official stated.

BrahMos is a joint collaboration between India and Russia and is capable of being launched from land, sea, sub-sea and air against surface and sea-based targets and has been long inducted by the Indian armed forces.

The range of the missile was originally capped at 290 kms as per obligations of the Missile Technology Control Regime (MTCR). Following India's entry into the club in June 2016, officials said the range would be extended to 450 kms and to 600 kms at a later stage. An extended range missile has already been tested, the latest on January 11 from indigenous guided stealth missile destroyer INS Visakhapatnam.

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Indigenous Intermediate Jet Trainer Completes Six-Turn Spins

06 January, 2022

Source: Times of India | https://timesofindia.indiatimes.com/india/indigenous-intermediate-jet-trainer-completes-six-turn-spins/articleshow/88734045.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst&pcode=461

BENGALURU: Defence PSU Hindustan Aeronautics Limited (HAL) on Thursday said that the Intermediate Jet Trainer (IJT), designed and developed by it for stage–II training of Indian Air Force (IAF) pilots has successfully demonstrated the capability to carry out six-turn spins.

The aircraft was piloted by Gp Capt (retd) HV Thakur and Gp Capt (retd) A Menon. HAL CMD R Madhavan said: "Given the right resources and backing, HAL is capable of designing products that can meet any requirement of Indian armed forces."

Mr Arup Chatterjee, director (engineering and R&D) added that by demonstrating its capability to have six turn spins on both sides the IJT has achieved a major milestone. "The success can be attributed to the synergy between designers, flight operations and certifying agencies," he said, adding that with the completion of spin certification of HTT-40 and the progress achieved in IJT, HAL will soon have the state-of-the-art trainers for stage I and II training of IAF pilots.

The IJT, which was conceived by HAL as a replacement to the ageing Kirans of IAF fleet, had completed demonstration of its capabilities in terms of altitude and speed envelope, load factor, satisfactory stall characteristics and limited armament capability as required by IAF, earlier.

"...The only pending task was spin testing. During the course of spin testing, in 2016, the aircraft departed from a controlled flight which brought the programme to a temporary halt. However, HAL decided to proceed further using its internal resources to complete the critical Spin testing," HAL said in a statement.

The PSU added that the capability to enter and recover from spin is a necessity for a trainer aircraft in order to familiarise the trainee pilot to recognise departure from controlled flight and the actions required to recover from such situations.

"Achieving satisfactory characteristics during spin and an assured recovery from spin form a part of very crucial flight tests due to its unpredictability. The spin flight testing is inherently a high-risk maneuver and therefore progresses incrementally turn by turn. Due to the complex interplay of aerodynamic and inertia forces, the motion of the aircraft in spin is unpredictable and flight testing is the only way to assess the acceptability or otherwise of its characteristics," HAL added.

Pointing out that spin flights are carried out in

good weather conditions with a team of designers, flight test engineers and safety pilots monitoring various parameters during the flight, HAL said, it was, therefore, time-consuming.

"Several flight tests are required to be carried out before six-turn spin flights are undertaken as well as a number of flights are further required before full spin certification is achieved," it added.

Subsequent to the temporary halting of flight tests in 2016, HAL undertook major modifications like shifting the vertical tail aft on the airframe and increasing the rudder area and flight testing resumed in April 2019.

These modifications entailed the use of a new Anti-Spin Parachute system (ASPS) which is mandated for the safety of the aircraft and test crew during spin flight testing. The new ASPS was integrated into the aircraft in July 2020 and the successful streaming of the parachutes were demonstrated in September 2020. HAL commenced the stall and spin testing of the IJT in its new modified configuration in November 2020.

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Technology Development

Contractors Demonstrate Single-User Drone Swarm at DARPA Experiment

Mark Pomerleau | 21 January 2022

Source: C4ISRNET | https://www.c4isrnet.com/unmanned/2022/01/20/contractors-demonstrate-single-user-drone-swarm-at-darpa-experiment/

Raytheon Technologies and Northrop Grumman recently demonstrated that a single user could control a swarm of over 100 unmanned systems in an urban environment. (Sgt. 1st Class Brent C. Powell/Army)

WASHINGTON — Raytheon Technologies and Northrop Grumman recently demonstrated the ability for a single user to control over 100 unmanned systems as part of a swarm in an urban battlefield setting.

The experiment was part of the Defense Advanced Research Projects Agency's OFFensive Swarm-Enabled Tactics (OFFSET) program, which envisions smaller units able to amass up to 250 small aerial and ground unmanned systems in urban areas.

During the November experiment at Fort Campbell, Raytheon's system allowed a single operator to successfully control a swarm of 130 physical drones and 30 simulated drones while Northrop

demonstrated a user controlling a swarm of 174 platforms.

"Combined air and ground behaviors, such as intel recon and area patrol, are some of the swarm tactics employed. We also were able to sustain swarm operations for up to 3.5 hours," Erin Cherry, senior technical program manager of emerging capabilities development at Northrop, said in a statement.

She added that Northrop's swarm was able to detect about 600 "artifacts" — intelligence, environmental information and mission scenario elements created by DARPA for the event — in roughly 20 minutes.

The Raytheon BBN-led team's used a combination of commercial off-the-shelf and custom built hardware and software for its swarming technology, even incorporating a virtual reality head set for the user to control the systems.

"We built this custom interface that uses that off the shelf hardware to provide a single person with this flexible God's eye view of the environment and all of the drones operating within it so that they can manage that larger swarm," Shane Clark, Raytheon BBN principal investigator for the OFFSET program, said in an interview, adding they had multiple interfaces to include ones that integrated with Android Team Awareness Kit.

Their system also had autonomous elements. For instance, if a user tasked a swarm to investigate or map a building, the system would choose the best or closest ground or air asset to respond without further human input.

While Clark couldn't speak directly to how this system would be used by the military specifically, he noted the government's thematic guidance for the experiment was for expeditionary forces at the company level and smaller.

Both companies intend to take their systems to the annual Army Expeditionary Warrior Experiment in March at Fort Benning. Clark said they'll be doing a demonstration where they'll be training active duty operators on how to use the system and getting their feedback on how well it works for them and whether the prototypes match with the tactical priorities and workflows they're familiar with.

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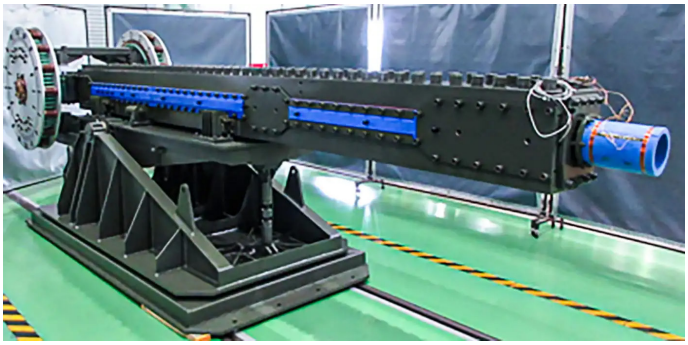
Japan Set to Develop Railguns to Counter Hypersonic Missiles

04 January, 2022

Source: Nikki Asia | https://asia.nikkei.com/Politics/Japan-set-to-develop-railguns-to-counter-hypersonic-missiles



As China, North Korea and Russia make hypersonic weapon advances, Japan has been researching the basic technologies behind railguns. (Photo courtesy of The Japanese Ministry of Defense)

TOKYO -- The Japanese Defense Ministry will develop a means to intercept hostile missiles using magnetically powered projectiles, sources told Nikkei Asia, as the nation scurries to respond to the hypersonic weapons being developed by China, North Korea and Russia.

The ministry is focusing on railgun technology that can launch projectiles with power generated when an electric current is applied to a magnetic field. The projectiles are faster than those shot from conventional intercept systems and can be fired continuously.

Together with long-range missiles, the next-generation system will provide Japan with multilayered intercept capabilities.

Hypersonic weapons, which travel faster than five times the speed of sound, are thought to be close to coming into practical use. In November, the Financial Times reported that four months earlier China was able to fire a missile from a glide vehicle traveling at hypersonic speeds over the South China Sea.

The speed of sound is about 343 meters per second.

Other countries apparently have similar technology. North Korea has claimed that a missile it launched into the Sea of Japan in September was a hypersonic device, and Russian President Vladimir Putin plans to deploy hypersonic cruise missiles this year.

Japanese policymakers see hypersonic weapons as the next generation of military weaponry and believe the country must urgently strengthen its deterrence, especially in regard to China.

Japan is developing a railgun system not to intercept missiles but to deter any from being shot in the first place, a policymaker told Nikkei.

Hypersonic missiles fly along irregular trajectories, so conventional intercept systems, which attack ballistic missiles flying on parabolic paths, cannot stop them.

The new system will reinforce Japan's missile response capabilities, which have been described by some experts as the "hole in Japan's defense." In addition to adding railgun interceptors to its existing missile defense system, Japan is considering long-range missiles that would allow it to return volleys from a distance. Together, the systems would create a three-tiered deterrent.

The Defense Ministry's Acquisition,

Technology and Logistics Agency has been researching the basic technologies behind railguns. An earmark of 6.5 billion yen ($56 million) has been included in the fiscal 2022 budget for the development of prototypes of military-use railgun equipment. Planners intend for the system to be ready for actual use in the second half of the 2020s.

Existing intercept missiles are limited to speeds of about 1,700 meters per second. Interceptors fired from electromagnetic railguns are expected to reach speeds of over 2,000 meters per second. During the research stage, a prototype achieved a speed of nearly 2,300 meters per second.

Increasing speeds raises the chances of interceptor being able to hit another hypersonic missile before it reaches its target. Being able to fire interceptors in rapid succession also improves the chances of hitting a missile traveling more than five times the speed of sound.

Railguns can also shoot interceptors at different speeds. By manipulating the amount of electrical power they apply, operators can adjust how fast an interceptor travels. Such decisions would depend on the speed of incoming missiles. It is difficult to manipulate the velocity of missiles fired with conventional propellants. The small size of a railgun's "bullets" also gives them a degree of stealth.

The U.S. and other countries are also working on railguns, but according to the Ministry of Defense, none have yet succeeded in putting the technology into practical use.

Increasing the speed of the bullets requires that they be made from a strong material that can easily conduct electricity. The ministry believes it can use the advanced material technologies of Japanese companies.

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Commentary

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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).

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