CENTRE FOR AIR POWER STUDIES (CAPS)
Forum for National Security Studies (FNSS)

AEROSPACE NEWSLETTER

Source: hindustantimes.com

VOL III NO 10 05 October, 2023

Centre for Air Power Studies | @CAPS_India
Centre for Air Power Studies | Centre for Air Power Studies

> *"Strategic air attack is wasted if it is dissipated piecemeal in sporadic attacks between which enemy has an opportunity to readjust defenses or recuperate"*
>
> *- General H. H. "Hap" Arnold*

Contents

Opinions and Analysis

1. Light Combat Aircraft: US-Backed FA-50 Takes a Clear Lead, JF-17 Banks on Chinese Push, but Tejas is the Real Darkhorse
2. F-16s are no Magic Bullets in Ukraine, but their Armaments will Matter

Air Power

3. IAF to use Better Tactics to Counter Chinese in Ladakh
4. Pakistan: CAA asks Airmen to Report Signal Interruptions to Air Traffic Controller
5. India's 'Quest' for UAVs Grow as China Takes a Giant Leap in UAV Tech & Pakistan Acquires Cutting-Edge Drones from Turkey
6. Lockheed's New F-16 Training Center in Romania could Train Ukrainians

Space

7. US Space Force Aims for more Efficient Operations with 'Integrated' Units
8. US Space Force Launches 'Victus Nox' Responsive Space Mission
9. FAA Proposes Upper Stage Disposal Rule to Limit Space Debris
10. "Silent Barker": US Spy Satellite to Counter Russia, China Threats"
11. Iran's 'Successful' Satellite Launch Sparks Alarm in West Over Aerospace Tech Advancement

Global Aerospace Industry

12. Serbia's First C-295 Cargo Plane Slated for Inaugural Belgrade Flypast
13. How Two SATCOM Companies are Responding to Starlink's Dominance
14. Rafales on the Upswing? French Fighter Eyes Additional Mideast Sales
15. US Space Force Eyes Partnerships for Tactical Satellite Communications
16. US Approves $5 bn Sale of F-35 Jets to South Korea
17. Swarm of Loitering Munitions Draws Attention at Serbian Defense Show

Indian Aerospace Industry

18. C-295 Induction Bolsters IAF's Transport Fleet and India's Aircraft Production Ecosystem
19. Hindustan Aeronautics Delivers 1st Tejas Twin Seater Aircraft to Air Force
20. Ramjet Technology: India's Impressive Progress and the Future of Aerospace

Opinions and Analysis

Light Combat Aircraft: US-Backed FA-50 Takes A Clear Lead, JF-17 Banks On Chinese Push, But Tejas Is The Real Darkhorse

Air Marshal Anil Chopra (Retd)
Director General, Centre for Air Power Studies | 03 September 2023

Source: Eurasian Times | https://www.eurasiantimes.com/light-combat-aircraft-us-backed-fa-50-takes-clear-lead-jf-17/

File Image: FA-50

The Turkish Aerospace Industries TAI Hürjet prototype made its first flight on 25 April 2023. This brought another competitor in the world's light fighter aircraft market, which was already seeing comparisons and competition amongst the HAL Light Combat Aircraft (LCA) 'Tejas,' CAC/PAC JF-17 'Thunder' and KAI FA-50.

Meanwhile, the Indian Air Force (IAF) has decided to order an additional 100 LCA Mk1A, making the Mk1 orders above 200.

The global air forces are looking for cheaper fighters to make good numbers. They are evaluating based on capabilities, cost, maintenance, and logistic support in times when supply-chain dynamics have become important. Let us look at these.

India's HAL 'Tejas'

The HAL Tejas program began in the 1980s. The aircraft made its maiden flight in 2001. It is the smallest and lightest in its class of contemporary supersonic combat aircraft. Extensive use of composites has been made.

Around 40 aircraft have been built. Thirty-four of them are with the IAF in two squadrons, the first of which was formed in 2015. The aircraft had the initial operational clearance in 2011 and final operational clearance in 2019. This indicates the slow design, development, and production rates.

Currently, three variants are flying, the Tejas Mk1, Mk1A, and a trainer version. The IAF has ordered 32 Mk1, 73 Mk1A and 18 Mk1 trainer aircraft.

LCA Mk1A made its maiden flight in May 2022. The Tejas Mk2 is under development, and the first flight is expected in 2024 and series production 3-4 years later.

As of 2022, indigenous content in the Tejas Mk1 is 59.7% by value and 75.5% by number of line replaceable units. The indigenous content of the Tejas Mk1A is expected to be 50% and rise to 60% by the end of the program.

LCA Mk1 and Mk1A use the General Electric F404-GE-IN20 engines. It has aerial refueling. Tejas has eight hard points. The Tejas weapon suite consists of I-Derby ER and Astra beyond visual range air-to-air missiles and R-73, Python-5, and ASRAAM close combat missiles.

The BrahMos-NG supersonic cruise missile is being developed for the Tejas. The Astra BVRAAM has already been test-fired. The aircraft has a Russian GSh-23 gun. A host of

other weapons are being integrated.

The MK1A will have EL/M-2052 AESA Radar and later indigenous Uttam AESA Radar, a self-protection jammer, updated avionics and electronic warfare capabilities, and DRDO-developed Onboard Oxygen Generation System (OBOGS), among other improvements.

DRDO labs will supply many locally developed critical avionics and upgrades, including flight control computers, Radar Warning Receivers, Head-up displays, etc. The Israeli DASH IV HMDS is used. It will carry a podded Elta ELL-8222WB self-protection jammer, the Rafael Litening III targeting/reconnaissance pod, and later the Litening 4I pod, and it will have software-defined radio-based secure communications and network-centric warfare capabilities. The Martin-Baker 16LG zero-zero ejection seat will be used.

LCA Mk1's max take-off weight is 13,500 kg. Internal fuel capacity is 2,458 kg with two 1,200-ltr external wing tanks and one 725-ltr fuselage tank. The ferry range is 1,850 km, and the combat range is 500 km. The thrust/weight ratio is 1.07.

The first Mk1A is expected to be delivered by March 2024. On 10 April 2023, HAL started a third production line at its Nashik Division that will increase production from 16 to 24 aircraft per year.

Tejas also has a naval variant that has landed and performed a ski-jump take-off on the aircraft carrier INS Vikramaditya and the indigenous aircraft carrier INS Vikrant.

Based on open sources, the LCA Program has spent an equivalent of ₹123 billion ($1.47 billion). Kaveri engine program spent roughly ₹24 billion ($300 million). HAL has ordered 99 GE-404 engines for nearly $750 million.

Flyaway costs of Mk1 are around ₹348 crore ($44 million). India has been trying to sell the LCA Mk1. The potential countries have been Indonesia, Egypt, Malaysia, Sri Lanka, Vietnam, and Botswana.

LCA has had failed bids with Argentina because the UK supplied items such as ejection seats, among others. Australian bid for 35 Tejas LIFT could not proceed forward due to Australia choosing to upgrade the BAE Hawks.

The Malaysians finally ordered 18 KAI FA-50 Block 20 aircraft. The FA-50 was chosen because of it being a tried-and-tested platform in service with numerous countries, while the Tejas was only with India.

The Philippines dropped the Tejas, preferring to choose between F-16V Block 70/72 and the JAS-39 Gripen C/D. Cash-strapped Sri Lanka decided to overhaul their Kfirs instead of buying new aircraft. The UAE dropped LCA and placed an order for 80 Rafale F4s from France and 12 Hongdu L-15 trainer and light combat aircraft from China.

KAI FA-50

Korea Aerospace Industries (KAI) and Lockheed Martin have jointly developed the supersonic T-50 advanced jet trainer, with TA-50 being the Lead-in fighter trainer and FA-50 as a light combat aircraft variant.

The T-50 partly resembles the F-16 Fighting Falcon and is 80% of the size. The development of the aircraft began in the 1990s and was funded 70% by the South Korean government, 17% by KAI, and 13% by Lockheed Martin.

The aircraft made its first flight in August 2002 and was introduced in service by February 2005. A multi-role variant was also considered but was

later shelved.

KAI and Lockheed Martin pursued a joint marketing program for the T-50 internationally. The aircraft variants are being operated by the Republic of Korea, Indonesia (22 since 2014), Philippines (12 ordered in 2014, more expected), Thailand (12 since 2015), Iraq (24 since 2016), Poland (ordered 48 in 2022), and Malaysia (18 in 2023). Nearly 200 have already been built. KAI will set up a service center in Poland due to its larger order.

The T-50 is equipped with a GE F404 engine built under license by Samsung Techwin. GE provides engine kits to Samsung Techwin, which also produces some parts and performs final engine assembly and testing.

The fighter/attack variants are equipped with the Elta EL/M-2032 fire control radar, the same as on the initial LCA MK1. The TA-50 can operate as a full-fledged combat platform with PGMs, air-to-ground weapons, and air-to-air missiles.

The TA-50 can carry pods for reconnaissance, targeting assistance, and electronic warfare. Reconnaissance and electronic warfare variants are also being developed, designated RA-50 and EA-50, respectively.

The TA-50 has a three-barrel cannon version of the M61 Vulcan mounted internally. Wingtip rails can accommodate the AIM-9 Sidewinder missile, and a variety of additional weapons can be mounted on underwing hard points.

South Korea is considering arming the FA-50 with a smaller version of the Taurus KEPD 350 missile to give it a stand-off engagement capability of 400 km. The aircraft has an internal fuel capacity of 2,655 liters. 1,710 liters can be carried in the three external fuel tanks.

The aircraft has a max take-off weight of 12,300 kg. The ferry range is 1,851 km, and the thrust/weight ratio is 0.96. The seven hard points can take up to 5,400 kg payload.

The FA-50 can carry more internal fuel, and the engine could be either Eurojet EJ200 or General Electric F414, giving up to 25% higher thrust. Other AESA radars, such as Raytheon's AN/APG-79 and Northrop Grumman's AN/APG-83, are options for future production.

Samsung Thales is also independently developing a domestic multi-mode AESA radar for the FA-50. The maiden flight of the FA-50 took place in 2011. 60 FA-50 aircraft were ordered by RoK AF.

In January 2019, KAI began development on an improved FA-50 known as block ten and block 20 upgrades. The Block 20 adds munitions such as the AIM-120 AMRAAM. Raytheon PhantomStrike and Northrop Grumman AN/APG-83 were being considered as the future AESA radars.

MBDA has offered to integrate the Meteor and ASRAAM medium and short-range air-to-air missiles on FA-50 and future KF-X fighter jets.

In February 2023, KAI announced the signing of a $920 million deal with Malaysia for the purchase of 18 FA-50 Block 20. The FA-50 was in competition with the Indian HAL Tejas, Italian Alenia Aermacchi M-346 Master, Turkish TAI Hürjet, Chinese Hongdu L-15, Russian Mikoyan MiG-35, and Sino-Pakistani JF-17 Thunder.

Malaysia may order 18 more FA-50s later. The deal gives an idea of aircraft cost. Prospective customers include Azerbaijan, Bolivia, Brunei, Colombia, Croatia, Pakistan, Spain, Slovakia, the United Arab Emirates, the United States, and

Vietnam.

Among the failed bids were from Argentina because of the British ejection seat. Israel chose the M-346s instead. So did Singapore. Taiwan decided to build 66 AIDC T-5 Brave Eagle supersonic trainers based on their existing AIDC F-CK-1 Ching-kuo fighters. The United States chose the Boeing's T-7 trainer. Due to political considerations related to Uzbekistan, the US refused to approve the sale.

CAC/PAC JF-17 Thunder

The JF-17 Thunder is a lightweight, single-engine, multi-role combat aircraft designed and developed by China's Chengdu Aircraft Corporation (CAC), along with the Pakistan Aeronautical Complex (PAC).

It is meant for use by the Pakistan Air Force (PAF) and for export. Pakistan had to move away from the US after sanctions were imposed in 1989.

The development of this aircraft was headed by Yang Wei, who also designed the Chengdu J-20. The aircraft made its first flight in China in 2003 and joined PAF in February 2010.

Production began in Pakistan in 2008. The JF-17 was first displayed internationally at the 2010 Farnborough Airshow. The aircraft can deploy diverse ordnance, including air-to-air, air-to-surface, anti-ship missiles, guided and unguided bombs, and a 23 mm GSh-23-2 twin-barrel gun (same as LCA).

The aircraft was initially powered by a Russian Klimov RD-93 engine and later by the Chinese Guizhou WS-13 engine. An improved version of the WS-13, developing a thrust of around 100 kN, is reportedly under development.

The JF-17 is now the backbone and workhorse of the PAF. The Block II variant costs $25 million. The JF-17's low cost is due to some of the onboard systems having been adapted from the Chengdu J-10.

58% of the JF-17 airframe, including its front fuselage, wings, and vertical stabilizer, is produced in Pakistan. 42% is produced in China.

PAC has the capacity to produce 20 JF-17s annually. By 2017, PAC had manufactured 70 Block 1 aircraft and 33 Block 2 for the PAF. In 2017, a dual-seat variant, JF-17B, was developed.

26 JF-17B Block-2 were delivered to the PAF by the end of 2020. In December 2020, PAC began serial production of a more advanced Block-3 version, which has a Chinese AESA radar, a helmet-mounted display (HMD), and, reportedly, an internal infrared search and tracking (IRST) system.

The Russians cleared to sell a large number of more powerful Russian Klimov RD-93MA engines despite Indian protests. The aircraft also got a cockpit and avionics upgrade. In March 2023, the first batch of JF-17C Block-3 aircraft was inducted into the PAF.

JF-17 Block 3 is claimed to be a "fourth generation plus" fighter. Block-3 has the Chinese KLJ-7A AESA radar, a variant of the KLJ-10 radar developed for the J-10. It has a 105 km (look-up) and 85 km (look-down) range and is licensed produced in Pakistan.

The EW suite is also linked to a Missile Approach Warning (MAW) system to defend against radar-guided missiles, the same as in J-10. There is a countermeasures dispensing system with decoy flares and chaff. There is an external self-protection radar-jamming pod.

The aircraft has an internal fuel capacity of 3,000 Litres. The thrust-to-weight ratio is 0.99 with full internal fuel. External fuel tanks are 2x 1,100 liter on wings and one 800 liter on fuselage.

The aircraft has in-flight refueling. Max take-off weight is 13,500 kg. The Max payload is 3,700 kg. The aircraft has four hard points under the wings, one under the fuselage, and two on the wingtips.

The wingtips can carry only the lighter close-combat missiles. The Chinese PL-12/SD-10 is the primary BVR AAM. Short-range, infra-red homing missiles include the Chinese PL-5E and PL-9C. The PAF is also seeking to arm the JF-17 with the PL10E IRIS-T or A-Darter.

PAF has 150 aircraft delivered and 38 on order. JF-17s are operational in seven PAF fighter squadrons based at five airbases. PAF JF-17s have taken part in joint Shaheen exercises with the Chinese PLAAF. In 2021, PAF JF-17s exercised in Anatolian Eagle, Turkey. In 2022, PAF JF-17s exercised at "Spears of Victory" in Saudi Arabia.

In 2015, Myanmar ordered 16 Block-2 aircraft for approximately $560 million. Nearly seven have been delivered. Myanmar Air Force has been facing serious technical issues.

In November 2022, it was reported that most of the newly acquired aircraft had been grounded due to structural cracks and other technical issues. Nigeria became the second customer in 2018 by placing an order for three Block-2 planes for US$184.3 million that were formally inducted on 21 May 2021.

PAF JF-17s saw military action, bombing terrorist positions in North Waziristan as part of anti-terror operations and in Operation Swift Retort in 2019. Nigerian Air Force (NAF) JF-17s have seen military action in anti-terrorism and anti-insurgency operations in Nigeria.

The potential buyers for the aircraft are Argentina, but the British ejection seat and some other systems have been an issue. China has reportedly offered the Chinese-origin HTY-5D ejection seat (used on the Chengdu J-10).

In May 2022, the Argentine Air Force delegation evaluated the JF-17 Thunder in China. No decision has been taken as of date. Azerbaijan, eyeing military cooperation with Pakistan, expressed its interest in purchasing JF-17.

Bolivia may be interested. China has offered it to Congo. Iraq was a contender. Malaysia finally chose FA-50 Block 20 jets in March 2023. Morocco, Sudan, Zimbabwe, and Qatar have shown interest. Saudi Arabia has been examining. Bangladesh, Bulgaria, Egypt, Jordan, Kuwait, Peru, South Africa, Uruguay, and Venezuela were being wooed by China. No deals have come through. Sri Lanka issued denials of any deal.

TAI Hürjet

The Turkish Aerospace Industries (TAI) supersonic advanced jet trainer, Lead-in fighter trainer/Light combat aircraft made its first flight on 25 April 2023. With a max take-off weight of just 6,500 kg, it is lighter. It is powered by one F404-GE-102 engine.

It is meant to replace Turkey Air Force's Northrop T-38 Talon trainer and supplement the F-16s in close air support role. A naval version may also be developed.

Hürjet is tailored to become a fifth-generation training aircraft. The certification is targeted to be completed by the end of 2025. Turkey requires 70 aircraft, and it would need international

customers. TAI aims to produce 24 aircraft a year after 2025.

Comparative Analysis

Purely on capability and technology levels, LCA Mk1A would be better than all competition. Aircraft is a futuristic design and also scores very high in performance. It is a single-country project but will remain dependent on significant imported systems such as the engine, ejection seat, AESA support and components, some weapons, and avionics.

Import content won't reduce much soon enough. It is costlier. However, the aircraft has an excellent safety record. The production has to be scaled up. IAF has a significant stand-alone order. Indian Navy may also order. India's marketing push has not been sufficiently aggressive. LCA has clear follow-on projects in place.

JF-17 is already being produced in larger numbers. It has the backing of Chinese tried and tested technology, albeit far behind the Western systems. The Chinese AESA and some avionics are not of the class of LCA.

It has the advantage of the latest Chinese missiles. The production quality has also been questioned, with skin cracks being reported. The RD 93 engine is not so fuel efficient, though supplies are in place. Aircraft is cheaper. The sales have aggressive Chinese push and backing. But only two countries have ordered very small numbers, and they, too, have been facing maintenance issues.

KAI FA-50 has the huge backing of Lockheed Martin and the US. South Korea itself has a high techno-industrial base, and most systems are being produced locally. It has already managed to find customers, and many have been sold or ordered.

More are likely to be sold in the coming time. TAI Hürjet is still new. It is more of an advanced jet trainer and is less of a direct competition to the LCA class.

For LCA to be able to sell, it first requires to ramp-up production. It needs to increase indigenization because the U.S. or UK could put export restrictions. It has to have a strong government-backed marketing team. As India grows in stature as the leader of the Global South, it must leverage diplomacy.

***

F-16s are no Magic Bullets in Ukraine, but their Armaments will Matter

Michael Bohnert | 03 October 2023

Source: C4isrnet | https://www.c4isrnet.com/opinion/2023/10/03/f-16s-are-no-magic-bullets-in-ukraine-but-their-armaments-will-matter/

U.S. Air Force Maj. Jacob Rohrbach releases a JASSM-ER weapon from an F-16 over the Gulf of Mexico on Sept. 19, 2018. (Senior Master Sgt. Michael Jackson/U.S. Air Force)

Now that Ukraine is in line to receive F-16s, opinions surrounding their effectiveness span from being counterproductive to war-winning for Ukraine. While most discussions have focused on the fighters' air-to-air performance and the platform itself, the broader effect of their

deployment with the right munitions will be decreased Russian ground strikes.

Neither the Ukrainians nor the Russians have air superiority over the battlefield. Surface-to-air missiles, or SAM, and anti-air artillery provide the majority of air control for both sides. And yet, Ukraine is too vast for SAMs to cover, as most require line-of-sight, limiting maximum ranges at lower altitudes. The mobility and line-of-sight of fighters makes them well suited to defend areas with sparse SAM coverage. Fighters can also avoid adversary SAMs by flying low while also being able to engage aircraft doing the same.

The aircraft's first role will likely be supporting air defense by intercepting cruise missiles. Given Russia's low monthly capacity for missile strikes on Ukraine, only a few F-16s are necessary to intercept cruise missiles that enter Ukrainian airspace — providing needed relief to Ukraine's overtaxed SAMs. Some commentators have highlighted the F-16′s ability to deploy cruise missiles and other munitions for strikes and interdiction such as the Storm Shadow missiles. However, those weapons are scarce, and F-16s provide only limited additional capacity unless Ukraine receives a large influx of air-to-ground munitions.

As Ukraine gains proficiency with F-16s, the next mission will be suppressing Russian SAMs, a mission that is more involved than stand-off strikes. F-16s are well suited to operate the AGM-88s that Ukraine has been supplied to suppress forward Russian SAMs. These destroyed Russian SAMs are expensive and unlikely to be replaced quickly. Attritting these systems is critical for Ukraine to gain local air superiority improving the survivability of its drones and ground forces in the process.

The two missions described are possible with the initial pledged F-16s. Of the approximately 60 F-16s promised, only around a dozen are expected by early next year. As more arrive, higher impact missions become possible.

Russia's limited capacity of stand-off munitions has not hindered its ground attack aircraft and helicopters from striking Ukraine. Initially, Russia resorted to flying below line-of-sight of Ukrainian SAMs while employing "dumb" bombs. Russia has since adapted to use precision, stand-off glide bombs. Russia has also employed its multi-role aircraft in air-to-ground roles as it faces little resistance in the air. F-16s can target the latter and force the former to air-to-air roles. Whether Russia diverts aircraft to air defense, takes higher risks, or performs fewer strikes, the result is fewer effective Russian air-to-ground strikes.

There will also be downstream effects on Russian operations. Russia has, for example, expended large quantities of its long-range SAMs for ground attacks. Given the high overlap of SAM, ballistic missile and air-launched missile components, increasing production of SAMs for replenishment will likely come at the expense of other missile production, which means even fewer Russian ground strikes against Ukraine.

F-16s alone are not enough. They require training, support crews, communications, early warning, upgraded avionics and munitions. This infrastructure takes years to develop and is not likely to be fully fielded in the conflict timeframe. To date, little public discourse exists on exactly what the pledged F-16s will have in terms of capabilities and supporting infrastructure.

Beyond a high probability that Ukraine will receive more AGM-88s and Joint Direct Attack

Munition (JDAM), no other public disclosures of F-16 munitions have been announced. NATO's most capable long-range, air-to-air missiles (AAMs) are the U.S. AIM-120D and the U.K. Meteor. These are necessary to overcome Russia's long range AAMs, yet neither has been pledged. Even if Russia has been inefficiently using its R-37′s by firing from long range and leaving the fight, Russia likely retains large quantities of R-77 missiles. It remains uncertain how many of the AIM-120 variants previously provided for air defense are still available. An F-16 with any AAM is still an improvement over Ukraine's current MIG-29s.

If Ukraine's F-16s are expected to strike ground targets, they will require the right munitions. F-16 munitions designed for fighting Cold War-era ground formations are the upgraded variants the CBU and Rockeye series. Soon these will need decommissioning and will lack host aircraft. Stand-off glide bombs like the GBU-39 are already being offered as ground-launched variants and the air-launched variant could provide needed survivability for the F-16 to strike ground targets.

Will F-16s win the war for Ukraine? No. Only ground victories and unacceptable Russian losses will force Putin to negotiate. The most important support to Ukraine is still artillery, medical equipment, infantry weapons, ground vehicles, and drones. However, a long-term commitment to supporting a well-equipped, sizable F-16 force will improve the likelihood of Ukrainian success even if an F-16 never shoots a Russian fighter.

***

Air Power

IAF to use Better Tactics to Counter Chinese in Ladakh

Pawan Bali | 04 October 2023

Source: Deccan Chronicle | https://www.deccanchronicle.com/nation/current-affairs/041023/we-need-to-match-new-tech-deployed-by-adversary-air-chief.html

Indian Air Force / Twitter

New Delhi: Asserting that the Indian Air Force will remain deployed at forward locations till there is complete disengagement by the Chinese forces in eastern Ladakh, the Chief of Air Staff, Air Chief Marshal V.R. Chaudhari, said on Tuesday that where the IAF cannot "counter the numbers or the might of the adversary", that "we will counter it through better tactics and better training".

The Indian Air Force is also on a mega Make-in-India drive with upto Rs 3 lakh crores in projects lined up to be signed, including 97 Tejas Mark 1A aircraft (Rs 1.15 lakh crores), 156 Light Combat Helicopter (LCH) Prachand (Rs 45,000 crores), upgradation of 84 Su-30 fighter aircraft (Rs 60,000 crores), Akash new generation missiles and long-range surface-to-air missile Kusha, among others. These projects will be delivered in seven to eight years.

With the Indian Air Force squadron strength

way less than the sanctioned 42, Air Chief Marshal Chaudhari said that the IAF "needs the numbers, the threat you are aware are from various fronts today". Addressing a press conference ahead of Air Force Day on October 8, the Air Chief added: "The challenges come from the newer technology platforms that our adversary possesses today… we need to match the technology with equivalent or better technology."

Air Chief Marshal Chaudhari said complete disengagement had not yet taken place at the Line of Actual Control with China and the IAF was constantly monitoring the situation across the border through intelligence, surveillance and reconnaissance (ISR). He said that the sheer number of radars and surface-to-air guided weapons was quite large and India was also looking to deploy mountain radars at strategic locations to be able to see equally deep into the adversary's territory..

"We make note of the buildup of resources and capabilities across the borders. Our operational plans are dynamic and keep changing based on the situation that we perceive that is developing across any front. In places where cannot really counter the numbers or the might of the adversary, we will counter it through better tactics and better training… We have very flexible and dynamic war plans, which we keep on revising based on the ISR inputs we get," he said.

Air Chief Marshal Chaudhari said that there was transfer of technology taking place between Pakistan and China and both are also conducting joint exercises. Pakistan is manufacturing JF-17 fighter aircraft and also inducting J-10 aircraft. "Wherever we can counter technology with technology, we will do it. Where we cannot, we will do it with better tactics and training and they will be continuously evolved. Since we have seen that both have now similar type of capability our tactics have been changed," he said.

Air Chief Marshal Chaudhari said the IAF received three units of S-400 air defence missile systems from Russia and due to the ongoing conflict with Ukraine more units have not been sent. He hoped that in one year the supply of S-400s will resume. India has signed a contract for five squadrons of the S-400 air defence missile system. Air Chief Marshal Chaudhari said the IAF was also pushing to get indigenously-built Kusha long-range surface-to-air missile systems for the long-range air defence systems developed by DRDO.

The IAF Chief said that the Air Force will stop flying MiG-21 fighter aircraft by 2025 and will replace the MiG-21 squadron with the LCA Mark 1A. "In another month or so, the second squadron will get number-plated and we will follow with the third one sometime next year. The induction of the LCA Mark 1A will fill the gap of these outgoing MiG-21s," he said.

On the accident between a Sukhoi-30 and a Mirage 2000 in Madhya Pradesh in January, in which one pilot waw killed, the IAF Chief said it was the result of a human error.

***

Pakistan: CAA asks Airmen to Report Signal Interruptions to Air Traffic Controller

Mohammad Asghar | 25 Septmeber 2023

Source: Dawn | https://www.dawn.com/news/1777683/caa-asks-airmen-to-report-signal-interruptions-to-air-traffic-controller

RAWALPINDI: The Civil Aviation Authority (PCAA) has issued notices to airmen of all aircraft, asking them to report to the air traffic controller (ATC) about any disturbances in GPS signals after signal interruptions were reported by aircraft.

The notices were issued to airlines, Pakistan Airline Pilots Association, IATA and others on September 22 and will remain valid till December 21.

It had been observed that aircraft were facing disturbances in getting GPS signals between Lahore and Karachi flight region. The aircraft were also having difficulties getting GPS signals between Lahore and Karachi flight information region (FIR).

The notices said occasional GPS signal interruptions had been reported around Lahore in a 100-nautical-mile radius, around the Lahore area in the sector south of Lahore, and also in some portions of Karachi FIR.

There were also complaints about not getting GPS signals around Rahimyar Khan airport.

"All pilots should promptly report to the Air Traffic Control (ATC) about such interruptions with appropriate details."

It said that in the event, take necessary measures for safe and efficient continuation of navigation, and in case of navigational difficulty, notify ATC for assistance.

Meanwhile, the CAA said that Pakistan Airspace was fully covered with state-of-the-art radar systems for the provision of air traffic services to all aircraft, including transit, landing and taking off.

A spokesman for the CAA said that all equipment provided by the CAA were ground-based for which VOR (VHF omnidirectional range) was a navigation aid that provides azimuth information for high and low-altitude routes and airport approaches.

On the other hand, another ground-based equipment called ILS (instrument landing system) is a precision runway approach aid to provide pilots with vertical and horizontal guidance during the landing.

As far as GPS (global positioning system) is concerned, it's a USA-owned utility that provides users with positioning, navigation and timing (PNT) services. GPS is a network of satellites and currently 31 GPS satellites are orbiting around the earth, providing users with accurate information on position, velocity, and time anywhere in the world.

There may be a reason for a space weather event (ionospheric disturbance) that may impact GNSS (global navigation satellite system) performance, possibly leading to the loss of GNSS signals and/or degradation of timing and positioning performance. This ionospheric activity has no link to any ground-based equipment, said the spokesman.

***

India's 'Quest' for UAVs Grow as China Takes a Giant Leap in UAV Tech & Pakistan Acquires Cutting-Edge Drones from Turkey

Ritu Sharma | 07 September 2023

Source: Eurasian Times| https://www.eurasiantimes.com/indias-quest-for-uavs-grow-as-china-takes-a-giant-leap/

TAPAS-BH-201 Indian Drone

In September 2020, China demonstrated 'innocuous' food delivery to troops in remote locations by a swarm of drones. The subtle message that drones that carry food can easily carry explosives was not lost on India.

On January 15, 2021, the Indian Army, in turn, displayed its drone-swarming capability with 75 indigenously designed and developed drone-simulated offensive missions.

Since then, the Indian armed forces have invested heavily in Artificial Intelligence, Autonomous Weapon Systems, Quantum Technologies, Robotics, Cloud Computing, and Algorithm warfare.

China is the leading exporter of military drones in the world. According to data from the Stockholm International Peace Research Institute (SIPRI), China has delivered 282 combat drones to 17 countries in the past decade.

Media reports worldwide indicate that Chinese armed drones are being used by countries like Saudi Arabia, Myanmar, Iraq, and Pakistan to subvert their adversary or quell unrest within their borders.

Chinese President Xi Jinping has described drones as capable of "profoundly changing war scenarios" and had pledged during the Communist Party's congress last year to "speed up the development of unmanned, intelligent combat capabilities." State funds and the civil-military fusion have made China the world leader in combat drones.

A reflection of the Chinese small drones dominating the world battlefield is that kamikaze drones deployed by Russia and Ukraine have Chinese components. The Shenzhen-based DJI owns 70 percent of the market share in small drone making.

The US has also unveiled a Replicator program to compete against China by fielding thousands of autonomous systems across multiple domains within the next two years.

The Indian government in 2022 banned Indian drone makers from using Chinese components. One year after the government's ban, India might not be catching up with China regarding combat drones, but it has the wherewithal to protect its interests.

"I will not be matching number to number (with China). But we have reached a level where we can protect our interest," retired Indian Air Force Officer Group Captain (Dr.) Rajiv Kumar Narang told the EurAsian Times. He authored a book titled "India's Quest for UAVs and Challenges."

"We cannot, however, let our guard down.

Critical drone components are still not made in India, and the Indian armed forces, in conjunction with the commercial drone sector, need to work on it, just like China," opined Group Captain Narang.

The Indian government has enabled policies to support domestic drone makers. India has set aside 1.6 trillion rupees (US$19.77 billion) for military modernization in 2023-24, of which 75 percent is reserved for domestic industry.

The Indian Armed Forces, taking a leaf out of China's playbook, are also roping in the private players. The Indian Air Force (IAF) recently awarded a 3-billion-rupee (US$36 million) contract to a New Delhi-based start-up, Veda Defense System, to make 200 long-range swarm drones.

As reported by the EurAsian Times earlier, the small drones can flock together to overwhelm anti-aircraft defenses with their sheer numbers.

Alternate Supply Chain

India is already feeling the headache from asymmetric warfare as its neighbor in the West is already using drones for smuggling arms, drugs, and counterfeit currency across borders through drones. The armed drone attack on June 27, 2021, on the Jammu air base also underscores the security challenges that drones pose to India.

The increased cooperation between Pakistan and two leading UAV manufacturers, namely China and Turkey, has increased the threat manifold, hence the need to give impetus to the Indian drone industry.

The ban on the Chinese component might have proved detrimental to the growth of the Indian drone makers, as finding an alternative supply chain can be costly. But in the long run, it has opened more doors for the Indian private players.

In August, an Indian developer of drone solutions for the commercial and defense sectors, Garuda Aerospace, announced new partnerships with Aero Sol and Titan Group from Israel, US-based Easy Aerial, and French Azur Drones.

The partnership allows Garuda Aerospace to fill up the 'void' left after the ban on Chinese DJI, which earlier supplied drones for varied purposes, including agriculture, construction, security, emergency response, and defense.

"We are delighted to have signed these key partnerships, helping facilitate the growth of India's drone market and ensuring the continued development of this hugely disruptive industry," said Agnishwar Jayaprakash, Founder & CEO of Garuda Aerospace.

"The fact that our partners span the US, Canada, Israel, and Europe reflects the expertise and vision of our team as well as the use cases for our drones – from monitoring the condition of state infrastructure, ensuring roads and bridges are constructed according to plan and crop spraying, to emergency response and deployment of anti-drone cyber security solutions, we are excited about the potential these partnerships hold."

The US and Indian Air Force signed an agreement in 2021 to develop air-launched UAVs jointly. The deal is the inaugural co-development project under the US-India Defense Technology and Trade Initiative, a bilateral military cooperation mechanism that promotes collaborative technology sharing, strengthens cooperative research, and enables co-production/ co-development of defense systems for the sustainment and modernization of military forces.

Experts expect the ban on Chinese components to spur more growth in the sector. "When you sanction import of certain components, in the short term, it is always detrimental. But in the long term, it helps you be self-reliant," said Rohit Shrivastava, Editor and Publisher of a report 'UAV Warfare.'

The DJI has the best possible economy of scale, making millions of drones yearly. It also makes components like cameras, communications, processors, and other critical equipment. A country looking to compete must create an ecosystem of its own.

The Indian Armed Forces is serious about 'handholding' the local drone makers. The swarm drones are in service now. The Indian Army inducted 97 indigenously built drones for surveillance along the China and Pakistan borders.

Group Captain Narang adds that if India wants to outpace China in the small drone sector, a more significant "civil-military integration" is required as "defense forces played an important role in Swarm technology in US, China, and India."

"India needs to focus on the self-reliant road map of the commercial drone sector. Integration of drone systems in commercial space is imperative. We can have an unmanned traffic management system, urban air mobility within cities, and advanced air mobility between cities," says Group Captain Narang. He adds: "We need a road map for the civil sector to become 'Atma Nirbhar' (Self Reliant) in the sector."

If India succeeds in outflanking China in the small drone segment, it can partner with countries with reservations about buying from China.

Technological Gap in the Indian Drone Industry

The Chinese military has supported the civil manufacturing and export programs. The Indian drone industry is divided into a small drone system and a more extensive aerial setup.

The former class of drones is the private sector domain, and the public sector is working on the larger drones. It is in the larger drone segment – High Altitude Long Endurance (HALE) and Medium Altitude Long Endurance (MALE) that India is facing hiccups.

Indian Armed Forces rely heavily on Israeli Searcher and Heron drones to meet their requirements. HALEs are essential for the Indian armed forces keeping an eye along the simmering Indo-China border in eastern Ladakh.

The Indian Defense Research and Development Organization (DRDO) is working on the MALE unmanned aerial vehicle Rustom-2. Rechristened as Tapas, Rustom-2 will soon be undergoing user trials.

The indigenously developed TAPAS 201 UAV achieved a major milestone in June 2023 as the DRDO and the Indian Navy successfully demonstrated the transfer of command-and-control capabilities of the UAV from a distant ground station to warship INS Subhadra.

The learnings from the TAPAS drone project have helped the DRDO dream of building a single-engine MALE.

There is a separate project for the weaponization of the Rustom UAV. It is in the final arms integration phase. ADA is leading it.

The aerospace major Hindustan Aeronautics Ltd. (HAL) is in sync with global development

as it expressed the ambition to develop a Combat Air Teaming System (CATS).

Colloquially called the 'Loyal Wingman,' CATS is planned to be with the Light Combat Aircraft (LCA), and in the future, it can be with a transport aircraft. The project is expected to be airborne by 2024. Another project for the air-launched swarm drones is still in the design stage.

***

Lockheed's New F-16 Training Center in Romania Could Train Ukrainians

Stephen Losey | 15 September 2023

Source: Defence News | https://www.defensenews.com/air/2023/09/15/lockheeds-new-f-16-training-center-romania-could-train-ukrainians/?utm_source=sailthru&utm_medium=email&utm_campaign=c4-overmatch

Two F-16 Fighting Falcons assigned to the 18th Aggressor Squadron, Eielson Air Force Base, Alaska, fly in formation during a Red Flag exercise in Alaska on Aug. 18. Lockheed Martin plans to open an F-16 training center in Romania that will echo the Air Force's international F-16 training curriculum. (Airman 1st Class Andrew Britten/Air Force)

NATIONAL HARBOR, Md. — Lockheed Martin expects to close a contract with Romania to open up its first F-16 flight training center in Europe, which could eventually train pilots from Ukraine.

The planned European Flight Training Center would be the U.S. company's first in the continent, and in the future could expand to teach pilots from nations other than Romania, OJ Sanchez, Lockheed's integrated fighter group vice president and general manager, told Defense News in a Sept. 13 interview.

The Romanians "need to train their pilots, and there was no good place to do that, as well as their maintainers," he said.

Lockheed announced late last month that it had signed a letter of intent with Romania and the Netherlands to establish the European F-16 Training Center. Sanchez said the company is confident its contract with Romania will be signed by the end of the year.

As part of this arrangement, the Netherlands will loan F-16s to Romania for training. Sanchez said the number of aircraft is still being negotiated as part of the larger contract.

Romania also struck a deal with Norway in November to buy 32 used F-16s, which would allow Romania to expand its fledgling F-16 fleet and retire the last of its outdated Soviet-era MiG-21 fighters.

At first, this training center will focus on teaching Romanian pilots to fly F-16s, Sanchez said. But over time, Lockheed hopes more nations could start sending their airmen there — including Ukraine.

"The European Flight Training Center may be a good option for countries like Ukraine, or others who may need that support as they build out their air force needs," Sanchez said.

Since Russia launched its invasion of Ukraine in February 2022, the embattled

nation repeatedly asked NATO nations for modern F-16 fighters to bolster and modernize its air force. Last month, the Netherlands and Denmark announced plans to provide Ukraine with its first F-16s, and the U.S. will help teach Ukrainian pilots to fly them.

Ukraine expects to continue modernizing its air force in years to come, and will need more venues where its pilots can learn to fly western fourth-generation jets. Lockheed sees this Romanian training center as one potential option for Ukraine.

Sanchez declined to offer details such as how many pilots this training center might be able to train annually, saying that information is not ready to be released. He said it's still too soon to say how soon the training center might start training the first Romanian pilots, but that Lockheed hopes to move quickly after the contract is signed.

But Lockheed plans for the Romanian training center's curriculum and approach to be largely similar to the Air Force's international training units. The Air National Guard's 162nd Wing in Arizona, for example, will start training some Ukrainian pilots to fly F-16s in October. The director of the U.S. Air National Guard predicted at AFA that some Ukrainian pilots could be finished within three months, depending on their skills and experience.

The flight training center in Romania will start with English language training, Sanchez said, since that is "the international language of flying."

International F-16 training also typically involves basic flight training academics, possibly including flights in a smaller plane like a Cessna to get the students some flight time, he said. After that, pilots have six to 12 months of basic flying in a jet, depending on their level of experience, before they get to specialized flight training in their fighter.

Lockheed Martin's goal is to have student pilots graduate from this Romanian training center with basic proficiency on an F-16 necessary to join a squadron and be an effective wingman, Sanchez said.

Those pilots would still need further training and development to grow and learn advanced maneuvers after graduation, but Sanchez said that more in-depth training would happen elsewhere.

Lockheed will take the lead on organizing this flight training center, including bringing together partners from European and U.S. companies to conduct flight and simulation training, Sanchez said. The company expects to have several former U.S. airmen in its ranks serve as flight instructors at the training center in Romania.

This will be the first F-16 flight training center Lockheed Martin has set up in Europe, but the company has launched other training centers elsewhere. The Romanian training center will focus entirely on F-16s, but Sanchez left the door open to starting additional centers that could teach pilots to fly other jets such as the F-35.

"Training is always a critical need and enabler," Sanchez said.

***

Space

US Space Force Aims for more Efficient Operations with 'Integrated' Units

Rachel S. Cohen | 15 September 2023

Source: Air Force Tiemes | https://www.airforcetimes.com/news/your-air-force/2023/09/14/space-force-aims-for-more-efficient-operations-with-integrated-units/?utm_source=sailthru&utm_medium=email&utm_campaign=c4-overmatch

Two members of the 216th Space Control Squadron set up antennas during the Black Skies electronic warfare exercise at Vandenberg Space Force Base, Calif., Sept. 20, 2022. (Tech. Sgt. Luke Kitterman/Space Force)

NATIONAL HARBOR, Md. — The Space Force hopes a new model that combines operations, maintenance and acquisition in a single unit will bring more flexibility and efficiency to its daily missions.

Two of those units, known as "integrated mission deltas," will stand up as early as October to "provide world-class effects in the face of a determined adversary," Chief of Space Operations Gen. Chance Saltzman said here Tuesday.

It's among the latest examples of how the youngest branch of the U.S. armed forces is trying to improve its combat prowess and quality of life by eschewing traditional military practices.

"As we've evolved from our historical origins in Air Force Space Command to the U.S. Space Force, it was an opportunity to relook at the kinds of organizational structures that we thought would be most effective for the new challenges associated with a contested space domain," Saltzman told reporters at the Air and Space Forces Association's annual Air, Space and Cyber Conference.

Typically, operations, sustainment, training and other facets of a squadron's readiness are managed by different commands with specialized expertise. But fragmenting those roles can make it more difficult for each organization to understand the larger picture, and it can slow any needed improvements.

The Space Force believes that the colonels who run deltas — the service's equivalent of Air Force wings or Army battalions — rank high enough to holistically manage readiness without losing touch with the realities of daily operations.

One new delta will support the Space Force's electromagnetic warfare mission, while the other focuses on the positioning, navigation and timing (PNT) enterprise — missions that could yield quick, actionable results for troops at home and abroad.

Because space electronic warfare units deploy overseas, Saltzman said an integrated mission delta can streamline the process of moving them around the world.

"Sometimes it's very simple. A deployable counter-[communications] system goes out the door with a generator. Does that generator work?" Saltzman said. "It's going to get to an austere location and it's going to have to have power. … We have to make sure that all the antennas have the right cabling [and] that the cabling is healthy

before it goes out. Then, when it's in the field, you've got to continue to do the maintenance."

The PNT delta will focus on ensuring maintainers and contracting staff are on the same page as systems age and new combat requirements arise.

Including an acquisition element in the integrated mission deltas can also allow guardians to quickly develop new hardware and apps they need to adapt to emerging threats.

Saltzman said the experiment will show the Space Force whether deltas can have their own acquisition cell without disrupting larger, longer-term programs underway at Space Systems Command, the service's development hub.

Other efforts to grow the military space enterprise are underway as well.

The Air National Guard is standing up two new military space units in Hawaii, including one to protect U.S. communications satellites and other space systems and another to infiltrate and confuse enemy networks.

And the Space Force in December aims to open a new subordinate headquarters in Europe to manage space operations across the continent. Those service component offices act as a voice for space missions in daily operations, ensuring the Space Force provides the right communications, missile warning and other services for troops in the region.

Space Force components are already working with the joint force at U.S. Indo-Pacific Command, U.S. Central Command and U.S. Forces Korea. That has created more realistic and helpful training exercises and built relationships between units, Saltzman said.

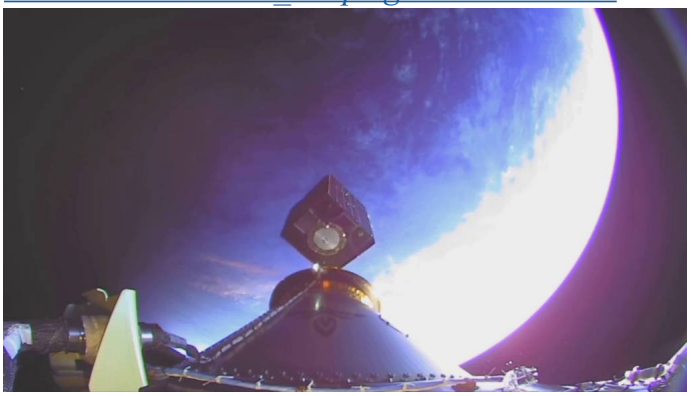
"They are talking with the same vocabulary, the same understanding of the missions, the same understanding of the people and the capabilities and it's a much tighter integration," he said.

***

US Space Force Launches 'Victus Nox' Responsive Space Mission

Courtney Albon | 15 September 2023

Source: C4isrnet | https://www.c4isrnet.com/battlefield-tech/space/2023/09/15/us-space-force-launches-victus-nox-responsive-space-mission/?utm_source=sailthru&utm_medium=email&utm_campaign=c4-overmatch



Against the backdrop of the Earth, Firefly Aerospace's Alpha rocket successfully deployed the VICTUS NOX satellite into orbit on Sept. 14 from Vandenberg Space Force Base, Calif. (Firefly Aerospace)

WASHINGTON — Firefly Aerospace's Alpha rocket successfully launched the U.S. Space Force's second operational tactically responsive space demonstration Sept. 14, setting a record for flying within 27 hours of receiving launch orders.

The Victus Nox mission, Latin for "conquer the night," was meant to demonstrate the ability to rapidly acquire, build, integrate and launch a satellite. Boeing subsidiary Millennium Space Systems built the spacecraft, which flew from Vandenberg Space Force Base, in California.

"The success of VICTUX NOX marks a culture shift in our nation's ability to deter adversary

aggression and, when required, respond with the operational speed necessary to deliver decisive capabilities to our warfighters," Lt. Gen. Michael Guetlein, head of Space Systems Command, said in a Sept. 15 statement.

SSC's Space Safari program office led the demonstration in partnership with the command's Rocket Systems Launch Program.

With the satellite now in orbit, the team will work to begin operating it in within 48 hours.

The Space Force chose Firefly and Millennium in 2022 to conduct the mission. Last month, the service notified the companies they had entered a "hot standby" phase, indicating the 24-hour launch window could open at any moment.

During that phase, Millennium sent the satellite from its facility in El Segundo, California, to Vandenberg, where the mission team tested, fueled and mated it to its launch adapter in less than 58 hours — a process that can take weeks or months for a standard launch.

The Space Force wants to have an enduring responsive space capability as soon as 2026, which would allow it to quickly launch satellites into space either to respond to an in-orbit threat or augment a degraded or destroyed system. That could mean having a spare satellite in orbit that could be turned on or maneuvered into position as needed, working with commercial partners to buy data in a crisis or, as in the case of Victus Nox, have a satellite on the ground that's ready to be launched on demand.

The mission is the Space Force's second tactically responsive space demonstration; the first flew in 2021 on a Northrop Grumman Pegasus XL rocket.

The service is making plans for a third launch, this time working with the Defense Innovation Unit. DIU announced Aug. 24 that the effort, dubbed Victus Haze, would focus on "end-to-end execution using commercial capabilities."

Victs Nox was the third flight for Firefly's Alpha rocket. Following this week's mission, the company said it is preparing for several upcoming missions for NASA, the National Reconnaissance Office, Lockheed Martin and other customers.

"As our third flight, this mission further validates Firefly's technology rigor, passion, and dedication that's required to prevail as the leading responsive launch provider for both government and commercial customers," Firefly's Vice President of Launch Vehicles Adam Oakes said in a statement.

***

FAA Proposes Upper Stage Disposal Rule to Limit Space Debris

Marcia Smith | 20 September 2023

Source: Space Policy Online | https://spacepolicyonline.com/news/faa-proposes-upper-stage-disposal-rule-to-limit-space-debris/

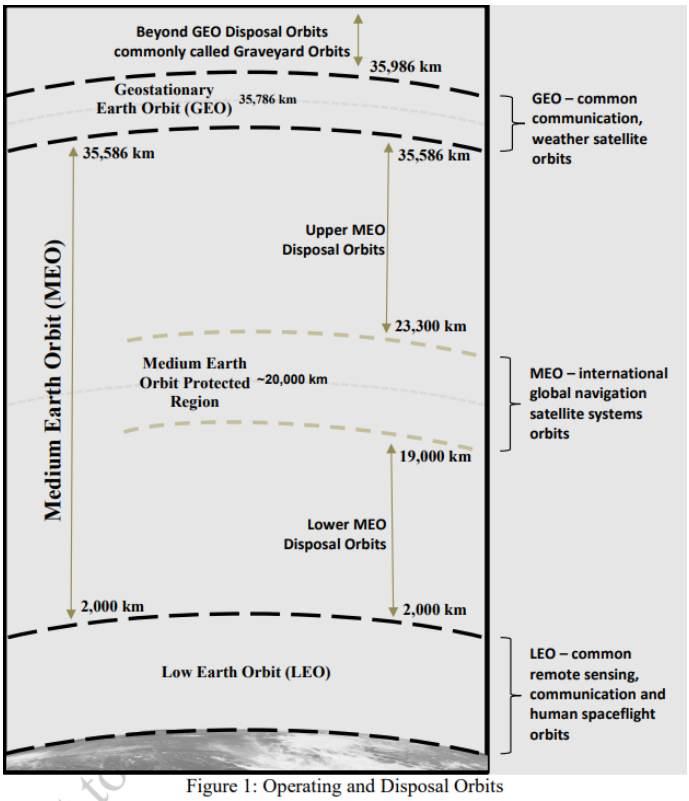


Figure 1: Operating and Disposal Orbits

Source: FAA proposed rule on upper stage disposal (Docket No.: FAA-2023-1858; Notice No. 23-13)

The FAA's press release says there are more than 23,000 objects in space 10 centimeters or more in size, although U.S. Space Command puts that number much higher at over 44,000. Millions of smaller pieces that cannot be tracked are also floating around in orbit.

Brian Weeden, Director of Program Planning at the Secure World Foundation, tells SpacePolicyOnline.com that the proposed rule appears to implement the updated U.S. Orbital Debris Mitigation Standard Practices issued in 2019. He considers them a "modest update" that "don't go nearly as far as some other countries" like France. Nonetheless "they're still a step in the right direction."

The FAA's proposed rule for upper stages comes one year after the FCC established a rule that requires satellite operators to deorbit their satellites within 5 years of mission completion if they are in low Earth orbit (below 2,000 kilometers).

Space debris is a growing threat to civil, commercial and national security space operations around the globe. Weeden and others are participating in the annual AMOS conference in Maui, Hawaii this week to discuss space debris and Space Situational Awareness (SSA), or Space Domain Awareness (SDA) as the military now calls it — knowing what's in orbit and keeping track of where it is and where it's going.

***

"Silent Barker": US Spy Satellite to Counter Russia, China Threats

Tony Capaccio | 07 June 2023

Source: NDTV | https://www.ndtv.com/world-news/new-us-spy-satellites-to-track-chinese-russian-threats-in-orbit-4100546

The satellites will be placed about 22,000 miles (35,400 kilometers) above the Earth.

The US Space Force is set to launch a constellation of satellites this summer to track Chinese or Russian space vehicles that can potentially disable or damage orbiting objects,

the latest step in the burgeoning extra-terrestrial contest between superpowers.

Dubbed "Silent Barker," the network would be the first of its kind to complement ground-based sensors and low-earth orbit satellites, according to the Space Force and analysts. The satellites will be placed about 22,000 miles (35,400 kilometers) above the Earth and at the same speed it rotates, known as geosynchronous orbit.

"This capability enables indications and warnings of threats" against high-value US systems and will "provide capabilities to search, detect, and track objects from space for timely threat detection," the Space Force, which is developing the satellites with the National Reconnaissance Office, said in a statement.

The Silent Barker satellite constellation is scheduled for launch after July on board an Atlas V booster operated by the Boeing Co.-Lockheed Martin Corp.'s United Launch Alliance, the NRO said in a statement. The launch date will be announced 30 days in advance on Facebook and Twitter - quite a change for an agency that's been around for decades but whose existence wasn't declassified until 1992.

Silent Barker is a response to efforts by China and Russia to develop systems capable of being launched into orbit and taking out other satellites, something that's a growing concern to the US.

The new constellation "will dramatically increase Space Force's ability to track on-orbit, adversary satellites that could be maneuvering around or in proximity to our satellites," said Sarah Mineiro, former lead staffer on the House Armed Services Committee strategic subcommittee that oversees space programs.

Grappling Satellites

Silent Barker addresses the limitations of ground or lower-orbit surveillance systems and allows the US to "really figure out what is going on up there in space," she said.

In its annual threat assessment this year, the Office of the Director of National Intelligence said China has weapons intended to target US and allied satellites, and "counterspace operations will be integral to potential PLA military campaigns," referring to the People's Liberation Army.

One example is China's SJ-21 satellite, which was launched in 2021 and later successfully pulled a defunct Chinese satellite several hundred miles into a higher orbit. Another Chinese satellite, the Sijian-17, is equipped with a robotic arm that "could be used for grappling other satellites," according to a 2022 Defense Intelligence Agency report.

In congressional testimony in March, Gen. James Dickinson, the head of the US Space Command, said the SJ-21 "could clearly serve in a counterspace role and hold our geosynchronous satellites at risk."The SJ-21 is the type of satellite Silent Barker would track as it seeks "to detect or discover new objects," Space Force said.

The Space Force and NRO wouldn't detail how many satellites would make up the Silent Barker constellation except to say that there will be "multiple space vehicles" involved.

Surveillance from space augments ground sensors and "overcomes ground sensor limitations by providing timely 24-hour above-the-weather collection of satellite data," the Space Force said. Ground-based sensors of objects in geosynchronous orbit "are limited by distance, geography, and weather" but "Silent Barker will

overcome observation gaps," it said.

***

Iran's 'Successful' Satellite Launch Sparks Alarm in West Over Aerospace Tech Advancement

Rohit | 07 September 2023

Source: News18 | https://www.news18.com/world/irans-successful-satellite-launch-sparks-alarm-in-west-over-aerospace-tech-advancement-8594186.html

Russia's Defence Minister Sergei Shoigu listens to Iran's Revolutionary Guards Aerospace Force Commander Amirali Hajizadeh as they visit an Iranian aerospace industry's exhibition in Tehran, Iran, September 20, 2023. (Reuters)

Iran's Revolutionary Guards "successfully" launched a new military imaging satellite on Wednesday, state media reported, in the latest display of its aerospace technology which has sparked Western concern. "The Nour-3 imaging satellite… was successfully placed in orbit 450 kilometres (280 miles) above earth," the IRNA news agency said, quoting Telecommunications Minister Issa Zarepour.

He said it was carried by the three-stage Qassed satellite carrier, which also launched predecessors Nour-2 in 2022 and Nour-1 in 2020. Wednesday's launch was carried out by the aerospace wing of the Islamic Revolutionary Guard Corps (IRGC), the ideological arm of the country's armed forces.

The United States has repeatedly warned Iran against such launches, saying the same technology can be used for ballistic missiles, including ones designed to deliver a nuclear warhead.

Other Western governments have voiced similar concerns. Iran counters that it is not seeking nuclear weapons and that its satellite and rocket launches are for civil or defence purposes only. It has struggled with several satellite launch failures in the past and the successful launch of its first military satellite into orbit, Nour-1, in April 2020 drew a sharp rebuke from the US.

Tehran has been under crippling US sanctions since Washington's 2018 withdrawal from a landmark nuclear deal which granted Iran sanctions relief in return for curbs on its nuclear activities designed to prevent it from developing an atomic warhead.

Iran has always denied any ambition to develop a nuclear weapons capability, insisting that its activities are entirely peaceful.

In a recent interview with a Japanese news agency, Foreign Minister Hossein Amir-Abdollahian spoke of a Japanese proposal to relaunch Iran's nuclear talks with the United States. Tehran and Washington have had no diplomatic ties since the aftermath of the 1979 Islamic revolution.

***

Global Aerospace Industry

Serbia's First C-295 Cargo Plane Slated for Inaugural Belgrade Flypast

Elisabeth Gosselin-Malo | 25 September 2023

Source: Defence News | https://www.defensenews.com/global/europe/2023/09/25/serbias-first-c-295-cargo-plane-slated-for-inaugural-belgrade-flypast/?utm_source=sailthru&utm_medium=email&utm_campaign=c4-overmatch

Indonesian paratroopers exit a C-295 transport aircraft

during an exercise in 2020. Serbia is scheduled to become a user of the aircraft type in September 2023. (Photo by Chaideer Mahyuddin/AFP via Getty Images)

BELGRADE, Serbia — The Serbian air force has taken delivery of the first of two C-295 transport aircraft ordered last year from Airbus, in what could signal a break from the country's reliance on Soviet-era and Russian aerial equipment.

In February 2022, Serbia inked a $91 million contract with Airbus for the supply of two military transport planes as well as associated pilot equipment and training services. The agreement also included government-to-government oversight between the ministries of Defense from Spain and Serbia with the aim of developing future defense programs.

The first C-295 is making its way to Belgrade via ferry, on the occasion of the Partner 23 arms fair taking place here from Sept. 25-28. According to the manufacturer, the plane was scheduled to conduct its first overflight above the capital on the opening day followed by the official hand-over ceremony.

The aircraft are produced at Airbus' production plant in Seville, Spain. They are slated to replace Serbia's Soviet-era Antonov An-26 aircraft.

The pair of new planes are to be handed over in transport configuration and both equipped with the Pro Line Fusion avionics suite by Collins Aerospace.

Airbus is eager to keep close relations with Serbia, which already operates other products made by the European aerospace and defense giant, a company statement said at the time of the signature of the deal.

The close ties are part of the reason why Belgrade is believed to have a solid shot at joining the SirTAP surveillance drone program led by Airbus, which remains in its pre-design phase.

"Airbus is promoting SirTAP in various countries beyond Spain, the launching nation, and is considering Serbia as a potential future opportunity, but cannot comment on details on the status of potential sales campaigns," Borja García de Sola, external communications manager at Airbus, told Defense News.

The C-295 type is marketed by the European aircraft manufacturer as a new-generation tactical airlifter designed to carry military cargo, troops, light military vehicles or other aircraft engines. It can transport up to nine tonnes of payload or as many as 71 soldiers or 50 paratroopers.

Serbia has increasingly looked to Europe-

based suppliers for military equipment, especially in the air sector. For some time now, the country has been entertaining the possibility of acquiring French-made Rafale fighter jets to replace its MiG-29 fleet and has previously turned to Airbus to supply nine H-145M multi-role helicopters.

In March of this year, the French MoD confirmed to Defense News that there were still ongoing discussions between France and Serbia regarding the possible procurement of the French jets.

***

How Two SATCOM Companies are Responding to Starlink's Dominance

Courtney Albon | 15 September 2023

Source: C4isrnet | https://www.c4isrnet.com/battlefield-tech/space/2023/09/15/how-two-satcom-companies-are-responding-to-starlinks-dominance/?utm_source=sailthru&utm_medium=email&utm_campaign=c4-overmatch

OneWeb announced Sept. 11 that Britain's Royal Fleet Auxiliary ship, Argus, had connected to its LEO constellation through a maritime-specific terminal – marking the first time a military vessel deployed its SATCOM services. (OneWeb)

LONDON — With SpaceX's Starlink constellation dominating the space-based communications market, longstanding satellite operators are positioning themselves to compete with the billionaire-owned company — particularly when it comes to military and government services.

SpaceX, with its 5,000-satellite Starlink fleet, has a hedge on the satellite communication market, but executives at U.K.-based OneWeb and Luxembourg-based Intelsat told C4ISRNET this week during the DSEI conference here they see opportunities to join the behemoth in meeting increasing connectivity demands.

Chris Moore, OneWeb's vice president for defence and security, said in a Sept. 12 interview demand for these services means that other providers likely won't be waiting in the wings much longer.

"We've got a supply problem — it's a good problem to have," he said. "There's plenty of room for us and Starlink in terms of meeting the world's connectivity problems in the short term. And of course, others are going to be coming online."

SpaceX's success with Starlink has also pushed its competitors to refocus and make new investments, according to Rory Welch, vice president of global government and satellite services at Intelsat.

"It's forced a lot of the traditional providers like Intelsat to up our game," Welch said in an interview. "And we are. We're making big investments in our future network."

Starlink's preeminence in the satellite internet services market has put SpaceX in the spotlight in recent weeks following the release of a biography of the company's billionaire founder Elon Musk. The book, written by journalist Walter Isaacson, claims that Musk secretly turned off Starlink services to prevent

Ukraine from targeting Russian naval vessels in Stevastopol, the largest city in Crimea.

Musk has since stated that he didn't turn off Starlink, but had in fact never activated the service in the region over concerns about how Russia might respond to an attack.

While SpaceX wasn't under a military contract at that time, the U.S. Defense Department has since formalized an agreement with the company for Starlink services, though officials have not confirmed details on the specifics of that deal.

The scenario has raised concerns among military leaders that commercial companies like SpaceX could refuse services in a time of conflict and underlines the pitfalls of relying on a single commercial provider for such a vital capability. Air Force Secretary Frank Kendall said this week at the Air Force Association's Air, Space and Cyber conference in National Harbor, Md., that without assurances that a commercial company will provide capabilities when needed, "they're not something we can rely on in wartime."

Global Coverage

For OneWeb and Intelsat, the path toward competing with industry giant SpaceX has included a certain degree of rebuilding. Both companies declared bankruptcy in 2020 and underwent a financial restructuring.

Since emerging from bankruptcy, OneWeb has launched hundreds of satellites to low Earth orbit — about 1,200 miles (2,000 km) above the planet's surface. That includes its latest batch in May, which brought its constellation to 634 spacecraft and helped it achieve global coverage in orbit. By early next year, it expects to have fully rolled out its ground infrastructure, which will close the loop for full global coverage.

During DSEI, OneWeb announced that Britain's Royal Fleet Auxiliary ship, Argus, had connected to its LEO constellation — marking the first time a military vessel deployed its SATCOM services. It also revealed the release of a portable, lightweight terminal that will bring broadband connectivity to users in remote areas. The equipment, which can fold into a large backpack, is ideal for military operators and rescue crews working in hard-to-reach areas with difficult terrain.

OneWeb's fleet is much smaller than Starlink's, but Moore said the company has a narrower customer base that includes high-end industries like telecommunications and energy as well as military and other government agencies. While it may compete with Starlink in those areas, it's less focused on the mass consumer market.

The company's impending merger with French SATCOM provider Eutelsat — which is set to close at the end of this month — will also allow it expand its coverage to new orbits, offering future customers a more diverse capability.

Eutelsat operates a fleet of satellites in geostationary orbit, about 22,000 miles (35,000 km) above Earth. The merger will combine the strength of those GEO-based satellites, which can transfer large amount of data at slower speeds, with OneWeb's LEO constellation, which offers higher bandwidth and lower latency to support real-time missions, such as machine-to-machine teaming for uncrewed military aircraft.

Having that multi-orbit solution, Moore said, differentiates the company from firms like

Starlink that are focused on LEO services.

OneWeb is also in the process of designing its next generation of LEO satellites, which could be operating as soon as 2027. The spacecraft will replace older systems in the constellation, bring more capacity and will be upgradeable through software modifications. The second-generation, or Gen 2, satellites will also be built with both military and commercial requirements in mind, Moore said.

"Where Gen 1 was very much a commercial platform and a commercial architecture with some military applications on top, we're designing Gen 2 to be dual-use from the outset," he said. "We're in lots of conversations with a few governments about what that looks like."

Beyond Low Earth Orbit

Intelsat has also been working to bolster its position in the SATCOM market. A central feature of that work was establishing its global government and satellite services business in January, which Welch leads.

The new business unit is focused on growing the company's work with international allies. That includes not only the traditional Five Eyes partners, but other countries in Eastern Europe, Scandinavia and the Asia-Pacific region who worry about security threats from Russia or China.

"When they spend more on defense, typically there's a drag along with them spending more on space," Welch said. "And these are countries that tend to operate in a more austere environment with less infrastructure or where they're doing more deployments outside of their individual countries, a lot more need for beyond-line-of-sight communications."

Along with offering Intelsat's core SATCOM services, the global business unit provides assistance to customers as they design, build, launch and operate their satellites.

The company is also looking to expand its global, GEO-based satellite network to include operations in medium Earth orbit, between GEO and LEO. Welch said Intelsat considered whether to develop its own LEO constellation but determined that MEO "made better sense" from a cost and complexity standpoint. The company is in the early stages of designing those satellites.

Intelsat is establishing new partnerships with LEO operators and is also producing a new line of software-defined GEO satellites that can reroute traffic and adjust beams to ensure full coverage across orbits.

"We're really focused on the multi-layer elements of our network because we really think that it's not just one — it's not just LEO or GEO or MEO," Welch said. "We're going to compete with Starlink and other LEO operators because we're a commercial company, but I think it's more about what we can do as a multi-orbit constellation."

***

Rafales on the Upswing? French Fighter Eyes Additional Mideast Sales

Elisabeth Gosselin-Malo | 07 September 2023

Source: Defence News | https://www.defensenews.com/air/2023/09/07/rafales-on-the-upswing-french-fighter-eyes-additional-mideast-sales/?utm_source=sailthru&utm_medium=email&utm_campaign=c4-overmatch

French President Emmanuel Macron, followed by French Defense Minister Sebastien Lecornu (2nd R), walks past a Dassault Rafale fighter aircraft during his New Year address to the French Army at the Mont-de-Marsan air base, southwestern France, on Jan.20, 2023. (Photo by Bob Edme/POOL/AFP via Getty Images)

MILAN — The United States' dominance of the combat aircraft industry could see increased competition as the French hope to bolster their slice of the pie. With a German veto blocking Eurofighter deliveries to Saudi Arabia, and amid Israel's persistent opposition to any F-35 sale to Qatar, this may be French firm Dassault's opportunity to further push its fighter in the region.

In July, French Armed Forces Minister Sébastien Lecornu visited Qatar where he met with the emir in hopes of strengthening their strategic partnership through operational and industrial cooperation.

Following the trip, reports emerged that Qatar may opt to purchase an additional 24 Rafale from Dassault, which would bring the country's fleet to 60, having acquired an initial batch of 24 in 2015 and another 12 in 2017. Although Qatar's Defense Ministry hasn't announced its decision, analysts have told Defense News such as sale appears likely.

"That they would come back to the table seeking another order is relatively unsurprising considering they already have the Rafale as well as another French-designed and -built type — the Mirage 2000-5 — in their fighter inventory," said Dan Darling, the director of military and defense markets at Forecast International.

Qatar would want a fleet of 60 Rafales for two reasons, Darling explained: for stronger deterrence capabilities and for political purposes. There is a political element attached to major defense purchases, he said, where Qatar "buys" influence with the exporting nation and vice versa.

Richard Aboulafia, a managing director at Aerodynamic Advisory who has tracked aircraft programs for more than 30 years, agrees the diplomatic benefits are key.

"They [the Qatari government] view fighter aircraft as an opportunity to purchase a strategic relationship, and given their recent history with Gulf neighbors, these are extremely important for Qatar," he said, referring to a recent diplomatic crisis that saw several nations accuse Doha of funding terrorist groups. "It isn't [about] the Rafales."

Experts, however, diverge over who could be the next customer of the Rafale in the greater Middle East. For Aboulafia, Saudi Arabia appears to be the logical contender, even if the U.S. agrees to sell F-35s to the kingdom.

"They [Saudis] already source F-15s from

the U.S. and of course want F-35s. But as they are eager to continue their dual-source decision, they'll want to buy another aircraft from another provider. Eurofighter tranche 2 is on hold. There's really nobody else other than France," he said.

Earlier this summer, while Germany relaxed arms restrictions on Saudi Arabia, it remained firm in blocking deliveries of the Eurofighter to the kingdom. The twin-engine aircraft is made by a consortium of French firm Airbus, British business BAE Systems and Italian company Leonardo.

Germany's decision appeared to have irked the U.K., given four years ago the British foreign secretary demanded Germany lift its restraints on weapons transfers because they stood to hurt the British defense industry. BAE Systems is one of the largest private sector employers in Saudi Arabia, where it employs 5,300 Saudis — 57% of its total workforce there.

Although Germany's Eurofighter veto could benefit Dassault in the absence of other competition, Darling said Saudi Arabia may not have a vested interest in the French jet because it fairly recently purchased more than 80 American-made F-15 fighters, upgraded legacy versions, and has expressed interest in buying the F-35 and joining the Global Combat Air Program. The latter is a trilateral effort involving the U.K., Japan and Italy to develop a sixth-generation fighter.

Meanwhile, Saudi Arabia and Iran are trying to improve diplomatic relations, with the latter's foreign affairs minister visiting the kingdom Aug. 17. However, Gaspard Schnitzler, a research fellow at the French Institute for International and Strategic Affairs, said it's unlikely this would hinder or stop France from selling the Rafale to Saudi Arabia.

It's possible pressure from public opinion or potential monetary risks could interfere with such a sale, "but we have to keep in mind that for years now, the Gulf has been one of the major export areas for French weapons," he added.

A more probable export opportunity for the Rafale, besides in Qatar, would be a top-up order by Egypt in light of the collapsed deal with Russia for Su-35 aircraft that fell through over U.S. sanctions, said Darling. Cairo last placed an order for 30 additional Rafales in 2021, bringing its fleet number to 54.

But no matter how well-placed the Rafale seems, an additional order from Qatar or its neighbors does not necessarily signal a declining demand for the fifth-generation fighter. Aboulafia and and Darling agreed that F-35 interest in the Middle East remains strong.

Several Arab states would indeed purchase the F-35 were it not for Israel's strict opposition. For instance, Qatar in 2020 reportedly made a formal request for the Lockheed Martin jet, which was closely followed by Israel declaring it would oppose any F-35 sale by the U.S. to the Gulf country. A concrete deal has yet to materialize.

"The main question is whether the U.S. would even be willing to sell the F-35 to Doha. It has been wary about F-35 sales to Arab states, primarily because of its commitment to ensuring Israel's qualitative military edge over its neighbors and rivals in the region," Darling said.

The same approach has applied to Saudi Arabia's interest in the F-35.

"Saudi Arabia would love F-35s, but unless the Biden administration offers them as part of a deal that involves normalized relations with Israel, it won't happen for a few more years at least,"

Aboulafia said. "None of these difficulties are in play in Europe, so European countries can just order F-35s without worry about disapproval."

***

US Space Force Eyes Partnerships for Tactical Satellite Communications

Courtney Albon | 07 September 2023

Source: C4isrnet | https://www.c4isrnet.com/battlefield-tech/space/2023/09/07/us-space-force-eyes-partnerships-for-tactical-satellite-communications/?utm_source=sailthru&utm_medium=email&utm_campaign=c4-overmatch

As the U.S. Space Force develops its next generation of tactical satellite communications systems, it wants to build on the international partnerships established through other programs, like Wideband Global SATCOM, illustrated here. (Boeing)

WASHINGTON — As part of the Space Force's effort to modernize its tactical satellite communications infrastructure, the service is considering how to ensure that international partners can benefit from and contribute to those capabilities.

That next-generation suite of more resilient communication satellites and ground capabilities is known as the Protected Anti-Jam Tactical Satellite Communications family of systems, or PATS. Leveraging partnerships with allies is a top priority for the effort, according to Charlotte Gerhart, who leads the tactical SATCOM division within Space Systems Command, the Space Force's acquisition arm.

That's in part because secure communication is key to any military engagement, particularly one that involves international cooperation, she told C4ISRNET in an interview.

"You've got to be able to share information," Gerhart said. "If I can have a direct link with my international partner who's there in a joint coalition with me performing efforts — be that strictly military efforts or just humanitarian efforts — if I can talk directly, then that communication loop is much faster, and as a team, we're so much more effective because we're talking directly to each other."

The program is part of a broader effort within the Space Force to ensure its satellite communications architecture is protected against enemy jamming and flexible enough to incorporate commercial systems and international capabilities. While PATS focuses on the service's tactical SATCOM mission, a separate effort, Evolved Strategic SATCOM, will overhaul the systems that provide strategic nuclear command, control and communications capabilities.

PATS includes three capability development efforts: a protected waveform; an enterprise SATCOM ground system; and a fleet of communication satellites. The Space Force plans to spend about $2.4 billion on the effort from fiscal 2024 to fiscal 2027, according to its FY24 budget proposal.

Gerhart and her team have been working toward interoperability with allied partners since the program's inception in 2018, but she said it takes time to establish the baseline technology

and certifications required to share technology with other countries. The COVID-19 pandemic also delayed some of those efforts, which require in-person, on-site analysis.

The government-developed Protected Tactical Waveform is the first entry point in the program for international partners. The capability will provide the program's anti-jam communications over a mix of government and commercial satellites operating in various frequency bands. The Space Force has demonstrated its utility in a number of demonstrations and is now working to integrate it into hardware.

The waveform is what will allow the U.S. and its partners to communicate and is key to enabling cooperation on other parts of the program. To use it, countries need certain cryptographic devices, which Gerhart's team is in the process of certifying with the National Security Agency.

Once those are certified and approved for international distribution, the program can begin to explore partnership opportunities to allow countries to use the waveform, which is managed by the program's ground segment, the Protected Tactical Enterprise Service.

PTES ensures the waveform can be distributed across various satellite systems. Boeing, which won a $383 million contract for the program in 2018, is developing the ground segment and ran a demonstration earlier this year that validated the full slate of capabilities using a commercial satellite. Gerhart said the program is on track to complete development and reach initial operations next year.

Once agreements are in place for partners to use the waveform and ground segments of the program, the service also expects to increase collaboration on the satellite capabilities. That network of spacecraft is called Protected Tactical SATCOM, and Boeing and Northrop Grumman are both developing prototype systems that will launch either in late 2024 or 2025, Gerhart said. The program office is working to get approval for its acquisition strategy and expects to make a contract award the operational satellites in FY24.

"PTES and the waveform are the very basic fundamental building blocks," she said. "When we get to the PTS satellite system, we are definitely working with international partners to understand what their needs would be for that type of capability."

Leveraging International Investment

As Gerhart and her team consider how to make the Space Force's tactical SATCOM capabilities available to other countries, they are also closely watching as allies and partners invest funding in systems of their own.

Countries including the U.K., Australia and Luxembourg — all of whom have participated in past U.S. SATCOM sharing efforts — are modernizing their own systems or working with commercial providers to increase access to crucial military communication capabilities.

The U.K. is in the midst of a £6 billion (U.S. $8 billion) effort to upgrade its satellite communication system, Skynet. Through the Skynet Enduring Capability program, the Ministry of Defence is developing a more advanced network of satellites and ground systems.

In April, Australia selected Lockheed Martin to develop its new satellite communications architecture, JP 9102, under a contract that could be worth up to AU$4 billion (U.S. $3 billion). The deal is the largest defense space award the

country has made.

Luxembourg's parliament approved a plan in June to acquire SATCOM from O3b mPower, a commercial constellation run by SES Space and Defense. The agreement will cost €195 million (U.S. $212 million) over a decade.

That growing investment in satellite communications and other space capabilities from militaries around the globe has driven a change within the U.S. Defense Department from focusing mostly on how its space assets might benefit other countries to now also considering how it can take advantage of allied capabilities.

The Space Force calls this approach "Allied by Design," and Gerhart said it's a concept the PATS program wants to embrace.

Previous U.S. tactical communications efforts such as the Advanced Extremely High Frequency or Wideband Global SATCOM programs have been praised for pursuing international partnerships. AEHF established sharing agreements with the U.K., Canada, the Netherlands and Australia. WGS also partnered with those countries, plus Denmark, Luxembourg, New Zealand, the Czech Republic and Norway.

For PATS, Gerhart said, the service wants to expand on that collaboration and look more closely at how it can use systems like Skynet.

"In the past, it's largely been ... we would build the satellite and we'd share that capacity," she said. "Can we do that in the reverse fashion in the future? The U.K. is building Skynet, can we use part of Skynet? Those are all the things that we're envisioning and thinking about."

That shift, Gerhart said, is similar to the current push within the Space Force to rely more on commercial space capabilities. While it will take time for operators to adjust to having a larger pool of SATCOM systems to draw from, she said she thinks the adjustment won't be as difficult as it may seem.

"It's not as hard as we think, but it will take a bit of work to make sure that we have everything in place on both sides of the partnership and that we do use those capabilities to the best extent possible," she said.

***

US Spproves $5 bn Sale of F-35 Jets to South Korea

13 September 2023

Source: Space War | https://www.spacewar.com/reports/US_approves_5_bn_sale_of_F-35_jets_to_South_Korea_999.html

An IAF IL-78 MKI carries out air-to-air refuelling. (Image source: @IAF_MCC)

The United States on Wednesday approved a $5 billion sale to South Korea of F-35s, top-of-the-line fighter-jets with stealth capacity, as tensions soar with North Korea.

The State Department informed Congress that it had given the green light to the sale of 25 of

the aircraft made by Lockheed Martin as well as engines and related equipment.

The sale "will improve the Republic of Korea's capability to meet current and future threats by providing credible defense capability to deter aggression in the region and ensure interoperability with US forces," a State Department statement said.

"The proposed sale of this equipment and support will not alter the basic military balance in the region," it said.

South Korea has operated F-35s since 2018. The United States only approves sale of the jets to its closest partners, with Turkey booted from the F-35 program after a major purchase from Russia of a missile defense system.

The sale comes as tensions keep spiraling with North Korea, which carried out its latest missile tests just as leader Kim Jong Un visited Russia to discuss greater weapons cooperation with President Vladimir Putin.

The United States has stepped up three-way cooperation with Japan and South Korea, allies that are home to US troops but were frequently at odds over historical disputes until overtures by South Korean President Yoon Suk Yeol.

At a summit last month at the Camp David presidential resort near Washington, President Joe Biden, Yoon and Japanese Prime Minister Fumio Kishida promised to work more closely together on North Korea and other challenges.

***

Swarm of Loitering Munitions Draws Attention at Serbian Defense Show

Elisabeth Gosselin-Malo | 27 September 2023

Source: C4isrnet | https://www.c4isrnet.com/unmanned/2023/09/26/swarm-of-loitering-munitions-draws-attention-at-serbian-defense-show/?utm_source=sailthru&utm_medium=email&utm_campaign=c4-overmatch

Belgrade, Serbia – At the heart of the main hall of the Belgrade Partner 23 Defense Fair, an unusual display of drone technologies captured the attention of visitors.

Over three dozen mini loitering munitions armed with aerial bombs were spread across the conference hall floor in a swarm formation. To their right a white rotary-wing hexacopter drone, about the size of a grocery shopping cart, was displayed, equipped with two 120mm aerial bombs, and to their left, the same system in black carried two 81mm aerial explosives.

The Serbian manufacturer behind this demonstration is Belgrade-based PR-DC, which is showcasing the third-series of its primary system, the Ika bomber. The rotary-wing drone is powered by six electric motors and has a flight time of 30 minutes when carrying a 20kg (44 lbs) payload. It's offered in gray, white and

black, as well as with different armament sets, typically produced by local supplier Krúsik.

Jovana Jevtić, marketing manager at PR-DC, told Defense News that the firm is eying the international market more than the domestic one.

"Saudi Arabia has shown great interest in the Ika bomber(s) for its military, which is expected to become operational in the next month or two. We are actually holding a demonstration for them today at our offices, to show them its capabilities and allow them to practice controlling it themselves," she said.

These platforms are among a sea drone systems presented at the fair. Such a vast range of available technologies highlights the rising level of competition in the market, as well as the challenges that exist within the Serbian drone industry, in part due to the country's procurement strategy.

As Belgrade attempts to strike a balance between greater diversification of international suppliers and further expanding its own domestic business, it often appears to create dual rivalries. Serbian drone manufacturers, although they do share some level of cooperation, must also battle each other for limited funding and contracts, both at a domestic and international level.

This was exemplified in February at the IDEX arms fair held in Abu Dhabi, where Serbia's president announced that the country would buy UAE-made loitering munitions despite a number of domestic alternatives.

These challenges were highlighted by a representative of the Military Technical Institute, the developer of the Sparrow drone, also known as the Vrabac. The aircraft institute, which is tied to the Serbian Ministry of Defense, unveiled an armed version of this system in 2022. Thus far, the primary user of the standard Vrabac has been the Serbian Armed Forces, though MTI is eager to market it internationally.

"It has grabbed the interest of many non-European countries, but the international market [for this industry] is fierce," said an MTI representative, who wished not to be named. "We have also encountered some organizational and funding issues."

The Serbian MoD appears to be focused on rectifying this situation, where in the last two months, it signed contracts with domestic factories for $55,8 million worth of weapons to be delivered to the country's military.

"We export to customers worldwide, making profit from this, which we invest back into our defense budget and towards enhancing our domestic production capabilities," Aleksandar Lijakovic, marketing director at Yugoimport-SDPR, a Serbian state-owned arms manufacturer, told Defense News.

***

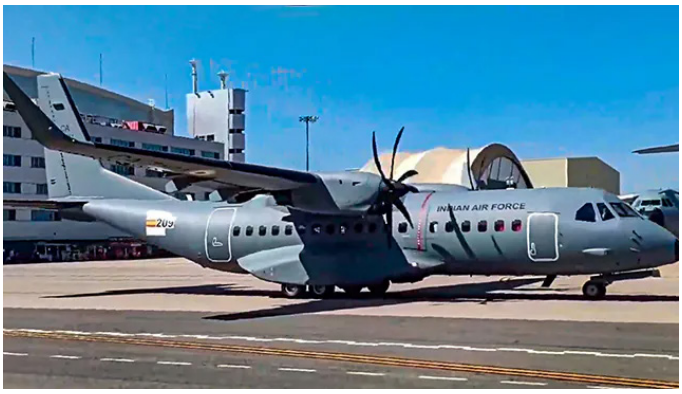
Indian Aerospace Industry

C-295 Induction Bolsters IAF's Transport Fleet And India's Aircraft Production Ecosystem

Air Marshal Anil Chopra (Retd)
Director General, Centre for Air Power Studies |

26 September 2023

Source: First Post | https://www.firstpost.com/opinion/c-295-induction-bolsters-iafs-transport-fleet-and-indias-aircraft-production-ecosystem-13172982.html



The first C295 aircraft, in Seville on 13 September, 2023. Chief of Air Staff Air Chief Marshal VR Chaudhari received the aircraft and took a sortie. PTI

The induction of C-295 will bolster the medium-lift tactical capability of the IAF. The defence and aerospace sectors are the two important pillars for making India self-reliant in the coming years," tweeted Defence Minister Rajnath Singh after formally inducting the first C 295 MW at a special ceremony at Hindon airbase on 25 September. He handed over the symbolic key of the aircraft to Air Chief Marshal VR Chaudhari. Also present were General VK Singh, the current Minister of State in the Ministry of Road Transport and Highways and Ministry of Civil Aviation and Spain's Ambassador to India, Jose Maria Ridao Dominguez. Just a few days earlier, the air chief had received the first aircraft in Seville, Spain.

We all recall that Prime Minister Modi had laid the foundation stone of the Tata-Airbus consortium's manufacturing facility in Vadodara, Gujarat, on 30 October 2022. The plant will make the C-295 military planes in India. It will be the first plant in the private sector to manufacture a military aircraft. In September 2021, the Indian government had cleared the ₹21,935 crore ($3 billion) Airbus-Tata project for 56 C-295MW military transport aircraft. An additional six may be acquired by the Coast Guard.

The deal for replacing the old Hindustan Aeronautics Ltd (HAL) license-built HS-748 (Avro) planes of the Indian Air Force (IAF) entailed the delivery of 16 EADS-CASA twin-turboprop aircraft in a flyaway condition by M/s Airbus Defence and Space (Spain), with the first delivery within two years of the signing of the actual contract. The remaining 40 will be manufactured in India by the Tata Consortium within 10 years. This will be the first time that an operational transport aircraft is being built in India, and also the first time any operational aircraft is being built by an Indian private sector company. Until now, all aircraft building was a monopoly of the public sector HAL. Giving a boost to "Atmanirbharta", the deal allows the transfer of technology to the private firm. India's fighter aircraft and helicopter building ecosystems are already in place, and now C-295 will give a boost to transport aircraft production in India."

Avro HS 748, the Great Workhorse

The Hawker Siddeley HS 748 is a medium-sized turboprop airliner originally designed and initially produced by the British aircraft manufacturer Avro. With its first flight in June 1960, the series-produced aircraft entered

service in 1961. Developed as a regional airliner, it was modified and adapted for the military transport role. India had emerged as the largest single market for the airliner, with Indian Airlines being the largest HS 748 civil operator, with a fleet of 26 aircraft. HAL built 89 aircraft, and an additional 20 of Series 2M with a large freight door. Nearly 50 are still in IAF service. The aircraft served the IAF very well in both communications and operational cargo roles. It could operate from short and unpaved airstrips. It flew to remote areas in the Himalayas and India's island territories.

C-295MW, the Great Operational Air Asset

The CASA C-295 was originally designed by the Spanish company CASA in the 1990s as the Nurtanio CN-235. CASA joined the European aeronautical group EADS in 2000. The now-designated C-295 made its first flight on 28 November 1997 and entered service with the Spanish Air Force in 2001. In the designation, 'C' represents CASA, the manufacturer, and then a three-digit number, of which the first indicates the number of engines, two in this case, and the next two indicate its target payload of 9.5 tonnes. The aircraft has a rear ramp door for quick-reaction and para-dropping of troops and cargo. All 56 aircraft will be installed with an indigenous electronic warfare suite.

The designation 'M' stands for the military transport version. The aircraft is capable of carrying up to nine tonnes of payload. This variant means a capacity for 71 troops, 48 paratroopers, 27 stretchers, five 2.24 × 2.74 m (88 × 108 inches) pallets, or three light vehicles. The 'W' is for the enhanced performance version with winglets and uprated engines.

The C-295 offers optional self-protection equipment, including cockpit armor, chaff/flare dispensers, along with radar warning (RWR), missile warning (MAWS), and laser warning (LWS) systems. In-flight refueling capability is an option for the aircraft.

C-295 aircraft of various variants are in service with Algeria, Angola, Bangladesh, Brazil, Canada, Chile, Colombia, Czech Republic, Ecuador, Egypt, Equatorial Guinea, Finland, Ghana, Indonesia, Ireland, Ivory Coast, Jordan, Kazakhstan, Mexico, Oman, Philippines, Poland, Portugal, Saudi Arabia, Spain, Thailand, United Arab Emirates, Uzbekistan, Vietnam, among a few others.

India's Continued Success in Aircraft Building

Big private industrial houses have come into defence manufacturing in a serious way. Tata Aerospace and Defence (Tata A&D) have been making the AH-64 Apache combat helicopter fuselage. They are also making aero-structures for Boeing's CH-47 Chinook helicopters. All C-130Js delivered to customers around the world have major aero-structure components from India producing 24 C-130 empennages annually. Sikorsky, a Lockheed Martin company, also relies on Hyderabad-based Tata Advanced System Limited (TASL) as the manufacturing base for its global supply of cabin for the S-92 helicopter. The Tata group is working with GE to manufacture CFM International LEAP engine components in India. Lockheed Martin selected TASL to produce F-16 wings in India. There are many private companies making defence electronics, large aero-components, advanced technology components, and sub-systems. Dynamatic Technologies makes assemblies of vertical fins for Sukhoi 30 MKI fighters. They are also supplying aero-structures to Airbus for its A320 family of aircraft and the wide-body 330 aircraft. Hyderabad's VEM technologies

manufacture center fuselage for LCA Tejas. Many Indian MSMEs and start-ups are entering defence production.

C-295 Production in India

The 16 flyaway aircraft are scheduled to be delivered between September 2023 and August 2025. The first Made-in-India aircraft will roll out of the new facility in September 2026, and the remaining 39 by August 2031. Of the 40 C-295s that Tata Aerospace and Defence (Tata A&D) will build, eight will be from semi-knocked-down (SKD) kits, and another eight from completely knocked-down (CKD) kits. The remaining 24 will have incrementally indigenizing assemblies and sub-assemblies. This would mean approximately eight aircraft produced per year. Before the completion of deliveries, a D-level MRO (maintenance, repair, and operations) facility will be set up in India. This facility will act as a regional MRO hub for various variants of C-295 aircraft. All 56 aircraft will be fitted with an indigenous electronic warfare suite developed by Bharat Electronics Ltd and Bharat Dynamics Limited. The indigenous content in the planes will be the highest ever in India, with 96 per cent of the work that Airbus does in Spain gradually being done at the new facility in India.

Manufacturing of more than 13,400 parts, 4,600 sub-assemblies, and all major component assemblies will be carried out in the country, while some equipment such as engines, landing gear, and avionics will be provided by Airbus Defence and Space and integrated into the aircraft by the Tata consortium, the defence ministry said. The Tata consortium has identified more than 125 domestic MSME suppliers spread across different states. The project will generate thousands of jobs. Also, around 240 engineers will be trained at the Airbus facility in Spain.

C-295 Operational Boost to IAF

Unlike the HS 748, the C 295 aircraft has a rear ramp that will ease loading and unloading and para drops. The aircraft can operate from short or unprepared airstrips. It will be well-suited for operations in the valleys and advanced landing grounds in the Himalayas. The aircraft's performance is better than both the HS 748 and the An-32 transport planes and can carry a larger number of troops and cargo. It has a better combination of range, speed, and service ceiling. It will be used as both a utility cargo aircraft and for para drop. In the past, the IAF had converted its transport aircraft such as An 12 and An 32 for the bombing role; such an option could be possible in the C295 as well. Unlike the other two, it has options for six external stores. In the long run, if India decides to extend the production line, it could also replace the depleting An 32.

Way Ahead

It's a momentous day for us, the IAF in particular and the nation as a whole, to be receiving the first aircraft which marks the beginning of a new era… where we will be manufacturing a military aircraft in India," ACM Chaudhari said, speaking to the media on the sidelines of the handover ceremony in Spain.

With fighter aircraft, helicopters, and UAV production already generally in place and getting a national-level push, C-295 manufacture in India will build a great transport aircraft production ecosystem and create world-class vendors. It will also bring better manufacturing and systems technologies. This project should also help India in pushing its commuter aircraft. The next logical step would be to build the regional jets and single-aisle aircraft of Boeing 737 and Airbus A320 class. It is pertinent to mention that China's Comac C919 narrow-body airliner is about to

enter service and has nearly 1,000 orders from Chinese airlines. India is the fastest-growing airline market, and there is a huge demand for civil aircraft and engines. There is also a huge maintenance Repair and Overhaul (MRO) market to be tapped. All this will give further push to the Atmanirbhar Bharat Abhiyan (self-reliant India campaign). The time to act for India is now, lest it becomes further late.

***

Hindustan Aeronautics Delivers 1st Tejas Twin Seater Aircraft to Air Force

04 October 2023

Source: NDTV| https://www.ndtv.com/india-news/hindustan-aeronautics-delivers-1st-tejas-twin-seater-aircraft-to-air-force-4448205

The LCA Tejas twin seater is a light weight, all weather multi-role 4.5 generation aircraft.

Bengaluru: Hindustan Aeronautics Limited today handed over the first LCA Tejas twin seater aircraft to the Indian Air Force.

The Bengaluru-headquartered company said the twin seater variant has all the capabilities to support the training requirements of the IAF and augments itself to the role of fighter as well in case of necessity.

Union Minister of State for Defence Ajay Bhatt was the chief guest during the function wherein the unveiling of the LCA twin seater, handing over of Release to Service (RSD), Signalling out Certificate (SOC) were conducted in the presence of Chief of Air Staff Air Chief Marshal VR Chaudhari, among others.

The LCA Tejas twin seater is a light weight, all weather multi-role 4.5 generation aircraft.

It is an amalgamation of contemporary concepts and technologies, such as relaxed static-stability, quadraplex fly-by-wire flight control, carefree maneuvering, advanced glass cockpit, integrated digital avionics systems and advanced composite materials for the airframe, HAL said.

This adds India to the list of "very few" elite countries who have created such capabilities and have them operational in their Defence Forces, it said, adding, it's another feather on the cap of "Atmanirbhar Bharat" initiative of the Government of India.

"This historic event today will mark the achievement of a key milestone of producing an LCA twin seater which is designed with a strategic intent of graduating the budding pilots from the twin seater variants to fighter pilots", HAL said.

HAL has an order of 18 twin seaters from IAF and is planning to deliver eight of them during 2023-24. The remaining 10 would be delivered progressively by 2026-27.

Further, more orders are also expected from IAF, the company said.

***

Ramjet Technology: India's Impressive Progress and the Future of Aerospace

Huma Siddiqui| 24 March 2023

Source: Financial Express | https://www.financialexpress.com/business/defence-ramjet-technology-indias-impressive-progress-and-the-future-of-aerospace-3011785/

Despite their limitations at lower speeds, ramjet engines are simple in design and have no moving parts, making them lightweight and easy to maintain. (Photo source: Ministry of Defence)

India's quest to become self-reliant or Atmanirbhar has seen the country make significant strides in the development of cutting-edge aerospace technology. One area of particular focus has been ramjet engines, which have the potential to revolutionize the aerospace industry.

About Ramjet Engines

Ramjet engines are a type of jet engine that differs from traditional engines in that they use the forward motion of a vehicle to compress incoming air, which is then burned with fuel in the compressed air without the need for rotating compressor blades. They operate only when the vehicle is travelling at high speeds, typically supersonic speeds, and are suitable for use in applications that require high speeds, such as missiles and some experimental aircraft. However, their efficiency is limited to high speeds, and they require additional systems to start and sustain combustion.

Despite their limitations at lower speeds, ramjet engines are simple in design and have no moving parts, making them lightweight and easy to maintain. They have the potential to be used in a wide range of applications, including hypersonic weapons, air-breathing propulsion systems, and space vehicles.

India's Own Ramjet Engine

India's progress in ramjet engine development is impressive, with the country successfully testing a solid fuel ducted ramjet (SFDR) engine in 2021. The C is designed to be used in missiles and can reach speeds of up to Mach 3.5, demonstrating India's commitment to developing cutting-edge aerospace technology. However, this is one of the 55 high priority projects under Defence Research and Development Organisation (DRDO) which have failed to meet the project deadline.

In March 2021, India successfully conducted a flight demonstration utilising the Solid Fuel Ducted Ramjet (SFDR) technology at a defence facility located near the Odisha coast. During the test, a prototype of an air-to-air missile, which utilizes the SFDR technology, was launched from the Integrated Test Range (ITR) to assess the system's performance. Following this, the nozzle-less booster was ignited, which increased acceleration to reach the required Mach number for ramjet operation.

The development of the engine, which is still in the early stages has the potential to revolutionise the aerospace industry, but there is still much work to be done. India will need to continue investing in research and development to make this technology a reality.

Update

In a written reply to a question in the Rajya Sabha earlier this week minister of state for defence Ajay Bhatt had said that nine of the 23 projects of DRDO have undergone cost overruns. According to him "not all cost overruns were necessitated due to time overruns."

Adding that DRDO's 55 high-priority projects could not meet the deadlines, and these include solid fuel ducted ramjet technology, surface-to-air missiles, anti-ship missiles, long-range radars, combat vehicles, anti-air field weapons, combat suits for submarines, high endurance autonomous underwater vehicles, and submarine periscopes, etc.

***

Commentary

1. How Cheap and Effective Loitering Munitions are Relevant to India's Defence Strategy - https://www.firstpost.com/opinion/how-cheap-and-effective-loitering-munitions-are-relevant-to-indias-defence-strategy-13190492.html

Further Reading

1. An-32 Aircraft: Golden Opportunity to Realize 'Make in India' Dream When Replacing Soviet-Era Transport Plane - https://www.eurasiantimes.com/golden-opportunity-to-realize-make-in-india-aircraft-dream-when/?amp
2. Indian Aerospace Industry : on a High Growth Trajectory - https://www.mmindia.co.in/article/93/indian-aerospace-industry-on-a-high-growth-trajectory
3. The Slow Militarization of India's Space Sector - https://thediplomat.com/2023/09/the-slow-militarization-of-indias-space-sector/
4. Russia's Bid to Return to the Moon comes to an Ignominious End - https://www.economist.com/science-and-technology/2023/08/20/russias-bid-to-return-to-the-moon-comes-to-an-ignominious-end

"The term 'Aerospace' was introduced in 1958 by the USAF Chief of Staff, General Thomas D White, as a new construct that depicted air and space as a seamless continuum stretching from the Earth's surface to infinity."

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

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

Supervised by : AVM Anil Golani (Retd)
Editor & Content : Gp Capt T H Anand Rao

Composed by Mr Rohit Singh
Tel.: +91 9716511091
Email: rohit_singh.1990@hotmail.com