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Regular features :
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OPINION

Lt Gen Kamal Davar (Retd) says...

Engage directly with Pak Army to break deadlock

The more things change, the more they remain the same — or so goes a popular truism. However, will it be so in the context of the vexed state of India-Pakistan relations after the recent ouster of the Imran Khan government in Islamabad? This does engage the minds of people and strategic analysts on both sides of the border between the two nations. Historical precedent, of course, points to the continuation of turbulence in varying forms and intensity as unnecessary mistrust and animosity have been the hallmarks of the two nations carved out of undivided India in 1947. Will Pakistan's new rulers — the combined Opposition under newly-appointed Prime Minister Shehbaz Sharif and backed by the Pakistan Army — change tack vis-a-vis India or persist with its traditionally myopic and self-destructive policies towards its larger neighbour to its east.

(Image: India.com)

Pakistan Army Chief General Qamar Javed Bajwa
(Photographer: Sven Hoppe/picture alliance/Getty Images)

Analysing the likely future contours of troublesome India-Pakistan ties is, however, shorn of unpredictably as past history portends. To the conservative watcher, Pakistan will continue to adopt the same policies towards India as the latter consistently looms large in all of Pakistan's politico-strategic formulations.

Pakistan's anti-India and Kashmir obsessions coupled with the export of terror remains the cornerstone of its foreign policy. It posing a threat to India along with a hegemonistic China appears to be a sturdy pillar of the anti-India stratagem of both countries.

Before surmising the likely future contours of India-Pakistan relations, it will be worthwhile to study the recent events in Pakistan which propelled a change of guard in Islamabad. That even charismatic cricketer-turned-politician Imran Khan could not complete his full term as Prime Minister was in keeping with Pakistan's unenviable record — of none of its PMs having ever completed a full five-year term. That Imran Khan assumed office by a narrow majority in 2018 was indeed helped by the Pakistan Army and Pakistan's Deep State — though this is denied by both.

That the gradual worsening of relations between Imran and Pakistan's most powerful institution had substantially contributed to Imran forfeiting his prime ministership cannot be dismissed either. It is also a fact that Imran Khan, despite his ouster, retains credible public support in his country and has reinforced it by citing the "foreign conspiracy" angle in his removal as Prime Minister.

Referring to his differences with the United States as the primary reason, Imran Khan had stoutly defended his Moscow visit two months ago to meet President

Vladimir Putin on the very day the Russian Army invaded Ukraine (24 February 2022) and his refusal to criticise Russia for it had, reportedly, angered the US administration. Meanwhile, Pakistan's Army chief Gen. Qamar Javed Bajwa, delivering a public lecture, appeared to extol the country's traditionally warm relationship with the United States and had sounded at variance with his own PM.

Additionally, according to reliable media sources, Imran Khan had also earlier scuttled Gen. Bajwa's efforts to resume trade ties with India and improve its overall relations with it. However, Gen. Bajwa, who was also trying for an extension, also fell out with his Prime Minister on the contentious issue of the next chief of the Pakistan Army, with just-retired Inter-Services Intelligence chief Lt. Gen. Faiz Hameed reportedly being groomed to replace Gen. Bajwa by Prime Minister Imran Khan himself. After a long standoff between Imran Khan and Gen. Bajwa on this issue, the relatively little-known Lt. Gen. Nadeem Anjum was appointed as the next ISI chief.

Meanwhile, Gen. Bajwa's recent eloquent statement at the Islamabad National Security Dialogue 2022, in which he stated that "I believe it is time for the political leadership of the region to rise above their emotional and perceptional biases and break the shackles to bring peace and prosperity to nearly three billion people of the region", has made waves all over. By all accounts, Imran Khan and his government would have not liked their Army chief making politically loaded statements and stealing their thunder. Thus, the inevitable had to happen and it was just a matter of time.

Prime Minister Shehbaz Sharif reportedly enjoys cordial relations with the Pakistan Army and thus, at least in the initial part of his tenure, could bank upon the support of the military establishment. Pakistan's new PM making various references to Kashmir should not bother us too much – we know, after all, that J&K is an integral and inalienable part of India, and we must realise that the Pakistani leadership has a political compulsion to refer to it off and on — it really does not matter.

The next general election in Pakistan is just over a year away. Imran Khan has already sounded his electoral bugle, exhorting the Pakistani masses to stand up to the "American bullies" and the Pakistan Army.

Indian and Pakistani border guards engage in a daily flag-lowering ceremony (Photo: CNN)

Whether Mr Sharif's Pakistan Muslim League (Nawaz) and Bilawal Bhutto's Pakistan People's Party will be able to share the spoils of power equitably and fight effectively together against Imran Khan's Tehreek-e-Insaaf party, supported by the many minor political conglomerates, will be evident in the coming months. Imran Khan may have been removed from power, but he has certainly not been finished politically.

Notwithstanding the political travails in Pakistan and whoever comes into power in Islamabad, the formidable stranglehold of the Pakistan Army onto the levers of power and decision-making is unlikely to change anytime in the near future. New Delhi must, therefore, endeavour to develop direct contacts with the Pakistan Army — that is the only way in which India-Pakistan relations might mend, or seen any improvement. A robust democracy in Pakistan remains a pipedream, but that is something the Pakistanis must decide for themselves. If the Pakistan Army, directly or indirectly, can contribute to peaceful and terror-free relations, it would be of help. From Gen Bajwa's very recent statements it appears the Pakistan Army establishment has realised the precarious situation their country is in, especially economically, and has felt the dire need to mend fences with both India and the United States. Let India, without dropping its guard and ensuring security preparedness of a high order, give the Pakistani establishment another chance. Pakistan too must never cross the "red lines" which antagonise India, and thus ensure, as Gen. Bajwa put it, "keep the flames of fire from our region". Only the immediate future will show the Pakistan Army's sincerity or otherwise in this regard.

(Photo: Vayu)

Admiral Arun Prakash says....

An 'atmanirbhar' India can look the world in the eye

Although Kyiv and New Delhi are 4,500 km apart, the reverberations of Russia's military assault on Ukraine are being acutely felt on Raisina Hill. The impact of this conflict on India, while no less severe, will be different in scope and ambit from Europe.

The West has, rightly, shown military forbearance in the face of Vladimir Putin's onslaught on a sovereign neighbour accompanied by nuclear sabre-rattling. But in a rare show of unanimity, economic sanctions, unprecedented in severity, have been imposed on Russia. As the rouble crashed and Russia's economy became unplugged, Putin described the sanctions as "akin to a declaration of war."

International attention, riveted on tenacious Ukrainian resistance and refugee evacuation from its war zones, has also tended to focus on India's noncommittal stand on Russian belligerence. Given its successive abstentions during votes in the UN Security Council and elsewhere, New Delhi has attracted criticism and even reproach from many quarters. While India's abstentions may be hard to justify on moral grounds, they are certainly rooted in "realpolitik". Citing India's unique juxtaposition at the cusp of the east-west duopoly, our diplomats consider that the country's vital national interests have been well served by its "balancing act." The intricacies of the long-simmering Russia-Ukraine tensions are another factor that has discouraged India from taking a hard stand.

While Putin's stated aim of "de-Nazifying" a democratic nation (headed by a Jewish president) may sound bizarre, Ukraine does have a past of collaboration with German occupying forces in WWII. Putin's neurosis, however, relates to the violation of guarantees, sought and received on the dissolution of the USSR that NATO would not expand even "an inch eastward". This solemn undertaking was violated when NATO enlisted, over a decade, 10 former Warsaw Pact members. By 2021, four more East European nations had joined NATO and Ukraine appeared to be on the verge of doing so. While the advance of NATO to its southern borders may have been seen by Putin as a dire threat to Russia, and to his dreams of "Russky-mir" — the restoration of Russia's glorious past — his resort to unilateral coercive military action against a sovereign state was a deplorable act that deserved the universal condemnation that it received. The stance adopted by India has placed it amongst a minority of nations, alongside China and Pakistan. Seen widely as pro-Russian, this posture is likely to affect India's international standing and bears reflection.

There is irrefutable logic in the argument that safeguarding the source of 60-70 per cent of its military hardware constitutes a prime national interest for India. Any interruption in the supply of Russian arms or spares could have a devastating impact on our defence posture vis-à-vis the China-Pak axis. Even after diversification of sources, India remains trapped in the Russian bear's jaws, jeopardising the credibility of its "strategic autonomy". The answers to India's agonising dilemma lie in two drastic imperatives, which must receive the closest attention of decision-makers. They are: The "de-Russification of the armed forces" and the genuine "indigenisation of India's defence technological and industrial base (DTIB)". Let me elaborate.

The aftermath of the 1962 Sino-Indian war saw Indian overtures for the purchase of modern weapon systems to Britain and the US. These were fobbed off with denial of credit and offers of WWII surplus equipment. Spurned by the West, India dropped like a ripe plum into the arms of Moscow's military-industrial complex, which offered "friendship prices" on rupee payment for advanced weaponry. Thus, in the popular Indian imagination, the USSR — having proved itself a steadfast supporter in the UNSC — had become a cornucopia of cheap arms for India.

Few realise that this "honeymoon" ended with the break-up of the USSR

in 1990. Shattered by the loss of many strategic industries to break-away republics, Russia's military-industrial complex, in oligarch hands, has been struggling against inefficiency, poor quality control and deficient customer support. Even though many Russian corporations have been rescued from bankruptcy by large Indian arms contracts, the relationship has become brittle and transactional. While demanding "top dollar", the operational availability of Russian systems remains depressed. It is time to initiate a process of progressive "de-Russification" of Indian armed forces; not to switch sources, but of becoming self-reliant.

Coming to the second imperative, by blindly stamping every piece of military hardware produced in India with the catchy "atmanirbharta" label, we are promoting dangerous self-delusion. It may be uplifting to see battle-tanks, warships and jet-fighters held up as examples of self-reliance, but what is never mentioned is that vital sub-systems like engines, guns, missiles, radars, fire-control computers, gear-boxes and transmission are either imported or assembled under foreign licences. Thus, while the public is led to believe that these platforms are "indigenous", many of the critical components are imported and spares continue to come from abroad.

Attaining genuine "atmanirbharta" certainly does not call for becoming autarkic. But it does require selective identification of vital military technologies in which we are deficient and demands the initiation of well-funded, time-bound, mission-mode projects to develop (or acquire) the "know-how" as well as "know-why" of these technologies. Having failed for 75 years after independence to attain a degree of self-reliance in military hardware that would have undergirded our "strategic autonomy," it is time for India to zero in on the reasons why we have failed, where peer-nations like China, South Korea, Israel, Taiwan and even Singapore have succeeded spectacularly.

The onus for this dismal situation falls on the politician, whose intense focus on the five-year electoral cycle and indifference towards national security has prevented the evolution of a long-term vision for India's Defence Technology Industrial Base (DTIB). The bureaucracy's incomprehension of military technology has allowed the defence science establishment to have its way without an iota of accountability for missing time, cost or performance targets. The key, however, lies with the military, which needs to look beyond its immediate operational needs and lend support to indigenisation. Only when it attains true "atmanirbharta" in arms, will India be able to look the world in the eye.

DAC's AoN for capital acquisition proposals

The Defence Acquisition Council (DAC), in its meeting of 22 March 2022 held under the Chairmanship of Raksha Mantri Rajnath Singh, accorded Acceptance of Necessity (AoN) for Capital Acquisition proposals of Armed Forces amounting to Rs 8,357 crore. As an impetus to 'Aatmanirbhar Bharat', all of these proposals have been approved under 'Buy (Indian IDDM)' category with focus on indigenous design and development and manufacturing in India.

AoNs accorded by DAC include procurement of Night Sight (Image Intensifier), Light Vehicles GS 4X4, Air Defence Fire Control Radar (Light) and GSAT 7B Satellite.

Procurement of 14 items worth Rs 380 crore

The Defence Acquisition Council (DAC), chaired by Raksha Mantri Rajnath Singh, on 22 March 2022, cleared the procurement of 14 items worth Rs 380.43 crore from the Innovations for Defence Excellence (iDEX) startups/MSMEs. These items will be procured by the Indian Army, Navy and Air Force.

The DAC also approved the new simplified procedure for procurement from iDEX startups/MSMEs. This would fast-track the procurement from the startups/MSMEs. The procurement cycle from the AON to contract signing will be around 22 weeks as per the new procedure. Suitable incorporation will be made in the Defence Acquisition Procedure 2022. The DAC also approved the simplified procedure for Make-II category projects on similar lines of iDEX procedure and would considerably bring down the time taken from prototype development to Contract signing in Make-II projects.

25% of acquisition budget for domestic private industry

In continuation with Government's efforts to promote Private Industry, MSMEs and Start-ups in defence production ecosystem, the Ministry of Defence has now decided that 25% of Domestic Capital Procurement/Acquisition Budget, amounting to Rs. 21,149.47 Crore, will be earmarked for Domestic Private Industry in the Financial Year 2022-23. Further, to foster innovation and encourage technology development in Defence, it has also been decided that an amount of Rs. 1,500 Crore will be earmarked for procurement from Start-ups, including iDEX Start-up, from within the allocations for Domestic Capital Procurement. Earlier, Ministry of Defence had decided to earmark 68% of Capital procurement budget for the entire domestic industry during Financial Year 2022-23. Accordingly, an amount of Rs. 84,597.89 Crore was allocated specifically for Domestic defence industry in current Financial Year.

ATAGS successfully tested

On 2 May 2022, the 155/52 mm ATAGS jointly developed by DRDO (ARDE) and Tata Advanced Systems (TASL) successfully completed the PSQR firing trials. "A true example of Public-Private Partnership leading to a world class weapon system fully designed and developed in India. Such a weapon system is highly strategic for India", stated company officials.

Offset obligations in defence contracts

MoD: The total number of offset contracts in which the vendors have defaulted/non-performed offset obligation during the last five years is 21 with non-performed amount of US $ 2.24 Billion till 31 December 2021. Action is taken against the defaulting/non-performing vendors by imposing penalty, after following the laid down procedure and same has been completed in 16 contracts with levying of penalty amounting to $ 43.14 million till 31 December 2021. During the last five years, offset claims worth US $ 2.64 billion have been submitted in 47 offset contracts till 31 December 2021.

MoD utilises 65% of CAB on domestic procurement

Ministry of Defence (MoD) had earmarked 64 per cent of Capital Acquisition Budget (CAB) for domestic industry in Financial Year (FY) 2021-22. At the end of FY 2021-22, MoD has been able to over achieve this target and has utilised 65.50 per cent of Capital Acquisition Budget on indigenous procurements through Indian Industry to achieve Prime Minister Narendra Modi's vision of 'Aatmanirbhar Bharat'. Further, as per preliminary expenditure report of March 2022, MoD has been able to utilise 99.50 per cent of the Defence Services Budget in FY 2021-22.

Pinaka Mk-I (Enhanced) and Pinaka ADM tested by DRDO

Pinaka Mk-I (Enhanced) Rocket System (EPRS) and Pinaka Area Denial Munition (ADM) rocket systems have been successfully flight-tested by Defence Research and Development Organisation (DRDO) and Indian Army at Pokhran Firing Ranges. A total of 24 EPRS rockets were fired for different ranges while conducting their test flights. Required accuracy and consistency was achieved by the rockets meeting all trial objectives satisfactorily. With these trails, the initial phase of technology absorption of EPRS by the industry has successfully been completed and the industry partners are ready for user trials/series production of the rocket system.

The Pinaka rocket system has been developed by Armament Research and Development Establishment, Pune supported by High Energy Materials Research Laboratory, another Pune-based laboratory of DRDO. The EPRS is the upgraded version of Pinaka variant which has been in service with the Indian Army for the last decade.

DRDO tests solid fuel ducted ramjet technology

Defence Research and Development Organisation (DRDO) successfully flight tested Solid Fuel Ducted Ramjet (SFDR) booster at the Integrated Test Range (ITR), Chandipur off the coast of Odisha on 8 April 2022. The test successfully demonstrated the reliable functioning of all critical components involved in the complex missile system and met all the mission objectives.

The SFDR-based propulsion enables the missile to intercept aerial threats at very long range at supersonic speeds. The performance of the system has been confirmed from the data captured by a number of range instruments like Telemetry, Radar and Electro Optical Tracking Systems deployed by ITR. The SFDR has been developed by Defence Research and Development Laboratory, Hyderabad in collaboration with other DRDO laboratories such as Research Centre Imarat, Hyderabad and High Energy Materials Research Laboratory, Pune.

MoD procurement through GeM reaches all-time high

Procurement orders by Ministry of Defence (MoD) through Government e-Market (GeM) portal has reached an all-time high of Rs 15,047.98 crore for Financial Year 2021-22. It is a jump of more than 250 per cent over the last financial year. The GeM was started in August 2016 to revamp the old tender process and bring greater probity and transparency in government procurement through digitisation. In a short span since its inception, the MoD has embraced the digital drive and embarked on this path with absolute resoluteness.

TASL delivers combat vehicles for Indian Army

Tata Advanced Systems Limited (TASL) has handed over first lot of Infantry Protected Mobility Vehicles (IPMVs) to the Chief of the Army Staff, General MM Naravane at a ceremony in Pune on 12 April 2022. With this milestone, TASL has become the first private sector company in India to produce and deliver wheeled armoured combat-ready vehicles for the Indian Armed Forces. In addition to supply, TASL will also provide 24x7 support to maintain the vehicles at the deployment locations. The IPMV is a co-development project with Defence Research and Development Organisation (DRDO).

The IPMVs have been developed and manufactured at TASL's Pune facility. These IPMVs have been built on the strategic 8x8 Wheeled Armoured Platform (WhAP) indigenously designed and developed by TASL along with the Vehicles Research and Development Establishment (VRDE), a unit of DRDO.

Army Chief inducts indigenous specialist vehicles

At a function organised at the Bombay Engineer Group (BEG) and Centre on 12 April 2022, the Army Chief inducted the first set of indigenously developed Quick Reaction Fighting Vehicle Medium (QRFV), Infantry Protected Mobility Vehicle (IPMV), Ultra Long Range Observation System developed by Tata Advanced System Limited (TASL) and Monocoque Hull Multi Role Mine Protected Armoured Vehicle developed by Bharat Forge.

The COAS appreciated TATA and Bharat Forge for their commitment in strengthening "Atmanirbhar Bharat" initiative of Government of India and continued engagement with the Indian Army for past decades. The induction of these indigenously developed Systems by TASL and Bharat Forge would greatly enhance the operational capabilities of Indian Army in future conflicts.

Second flight-test of ATGM 'HELINA'

As part of the ongoing user validation trials, indigenously-developed Anti-Tank Guided Missile 'HELINA' was again successfully flight-tested from Advanced Light Helicopter on 12 April 2022. Teams of Indian Air Force and Indian Army, along with Defence Research and Development Organisation (DRDO), conducted the trial at the high altitude range. This is the second successful flight-test in successive days. The recent trial was carried out for different range and altitude. As per the plan, the missile engaged the simulated tank target accurately. The trials were witnessed by senior Army Commanders and scientists of DRDO. With the flight-test, consistent performance of the complete system, including Imaging Infra-Red Seeker, has been established, which will enable the induction of the 'Helina' into the Armed Forces. Earlier, validation trials of the 'Helina' were conducted at Pokhran in Rajasthan, which proved the efficacy of the missile in desert ranges.

BHEL signs MoU with GE Power Conversion

The signing of a Memorandum of Understanding (MoU) between Bharat Heavy Electricals Limited (BHEL) and GE Power Conversion has provided a boost to the indigenous capability in the field of advanced technology for Integrated Full Electric Propulsion System. With the signing of the MoU on 28 April 2022, the expertise and facilities of GE Power Conversion and BHEL can be leveraged for quick induction of this advanced technology, combining indigenous manufacture, by the Indian Navy, which has been at the forefront of Aatmanirbhar Bharat - Make in India programme. GE Power Conversion is a world leader in electric propulsion, with equipment installed on some of the latest platforms of the US Navy and the Royal Navy, including the Queen Elizabeth class of aircraft carriers.

Commissioning of 830 Sqn (CG)

830 Sqn (CG), the first Indian Coast Guard Advanced Light Helicopter (ALH) MK III squadron has been commissioned at Bhubaneshwar and adjoining Region. ALH MK III helicopters feature array of state of art sensors, which add up to maritime prowess of Indian Coast Guard at sea. These helicopters have powerful Shakti engines, full glass cockpit, high-intensity searchlight, traffic alert and collision avoidance system, advanced communication systems, automatic identification system, search-and-rescue homer and automatic flight control system and is fitted with modern surveillance radar/electro-optical equipment, which enables them to undertake the role of long range maritime reconnaissance, in addition to providing long range search and rescue, both by day and night.

Out of 16 ALH MK-IIIs,12 have been inducted in the Indian Coast Guard in a phased manner and 4 of these are positioned at Bhubaneswar, covering the entire coast of West Bengal and Orissa under their surveillance efforts. 830 Sqn (CG) is commanded by Commandant Anurup Singh, TM and manned by 11 Officers and 46 men.

Commissioning of 845 SQN (CG)

Indian Coast Guard commissioned its second ALH Mk III Squadron on 4 May at Coast Guard Air Enclave Kochi. The commissioning of this squadron earmarks a considerable leap towards self-reliance in the field of helicopter mounted SAR and long range maritime surveillance, in line with government's push towards "Aatmanirbhar Bharat".

Two ALH's for INS Parundu

Two indigenously built Advanced Light Helicopters (ALH) were formally inducted at Indian Naval Air Station, INS Parundu at Ramanathapuram, Tamil Nadu on 23 March 2022. The Flag Officer Commanding-in-Chief, Eastern Naval Command, VAdm Biswajit Dasgupta, was the Chief Guest of the Ceremony.

Six of seven new (ex-OFB) companies report profits

Six of the seven new defence companies, which were dedicated to the nation on the occasion of Vijayadashmi on 15 October 2021, have reported provisional profits during the initial six months of their business, i.e., 1 October 2021 to 31 March 2022. Except Yantra India Limited (YIL), all other companies - Munitions India Limited (MIL); Armoured Vehicles Nigam Limited (AVANI); Advanced Weapons and Equipment India Limited (AWE India); Troop Comforts Limited (TCL); India Optel Limited (IOL) and Gliders India Limited (GIL) have reported provisional profits.

Private participation in defence industry

Defence Industry sector, which was hitherto reserved for the public sector, was opened up to 100 per cent for Indian private sector participation in May 2001. So far, Government has issued a total of 568 Defence Industrial Licenses to 351 companies. Out of these, a total of 113 companies covering 170 Defence Industrial Licences have conveyed commencement of production. As per the condition stipulated in the Licence, the Defence Industry is required to provide the standards and testing procedures for equipment to be produced to the Government nominated Quality Assurance Agency. The nominated Quality Assurance Agency inspects the finished products and conducts surveillance and audit of the quality assurance procedures.

Indigenisation in defence manufacturing

The Government has taken several policy initiatives in the past few years under 'Make in India' programme and brought in reforms to encourage indigenous design, development and manufacture of defence equipment in the country, thereby reducing import of defence equipment. These initiatives, inter-alia, include according priority to procurement of capital items from domestic sources under Defence Acquisition Procedure (DAP)-2020; Announcement of 18 major defence platforms for industry led design and development; Notification of two 'Positive Indigenisation Lists' of total 209 items of Services and two 'Positive Indigenisation List' of total 2851 items and 107 Line Replaceable Units (LRUs) of Defence Public Sector Undertakings (DPSUs), for which there would be an embargo on the import beyond the timelines indicated against them; Simplification of Industrial licensing process with longer validity period; Liberalisation of Foreign Direct Investment (FDI) policy allowing 74 per cent FDI under automatic route; Simplification of Make Procedure; Launch of Innovations for Defence Excellence (iDEX) scheme involving start-ups and Micro, Small and Medium Enterprises (MSMEs); Implementation of Public Procurement (Preference to Make in India) Order 2017; Launch of an indigenization portal namely SRIJAN to facilitate indigenisation by Indian Industry including MSMEs; Reforms in Offset policy with thrust on attracting investment and Transfer of Technology for Defence manufacturing by assigning higher multipliers; and Establishment of two Defence Industrial Corridors, one each in Uttar Pradesh and Tamil Nadu.

Upgrading the functioning of Coast Guard

The Government has established a robust maritime search and rescue framework to address and respond to various contingencies in deep sea and in coastal areas of India, which includes distress onboard fishing boats and merchant vessels, safety of life during marine incidents and Search and Rescue (SAR) response during cyclones etc. Director General Indian Coast Guard has been designated as the Chairman of National Maritime Search and Rescue Board (NMSARB), which constitutes members from national/coastal state administration/agencies. The force levels of Indian Coast Guard has been enhanced to 159 ships and 72 aircrafts. Further, 16 District Headquarters and 42 stations have been set up all along the coastline.

DRDO tests Indian Army version of MRSAM

Defence Research and Development Organisation (DRDO) conducted two successful flight tests of the Indian Army version of Medium Range Surface to Air Missile (MRSAM) at Integrated Test Range, Chandipur off the coast of Odisha on 27 March 2022. The flight tests were carried out as part of the live firing trials against high-speed aerial targets. The missiles intercepted the aerial targets and destroyed them completely, registering direct hits at both the ranges. The first launch was to intercept a medium altitude long range target and second launch was for proving the capability of a low altitude short range target.

This MRSAM version is a surface-to-air missile developed jointly by DRDO and Israel Aerospace Industries (IAI), Israel for use by the Indian Army. The MRSAM Army weapon system comprises multi-function radar, mobile launcher system and other vehicles. The flight tests were carried out with the weapon system in deliverable configuration.

Army variant of MRSAM completes development trials

Medium Range Surface-to-Air Missile (MRSAM) Army weapon system has once again proved its effectiveness as two missiles, during the flight tests, achieved direct hits against high speed aerial targets at Integrated Test Range, Chandipur off the coast of Odisha on 30 March 2022. With the conclusion of flight trials for different ranges and scenarios, the system has completed its development trials. Raksha Mantri Rajnath Singh complimented DRDO, Indian Army and the Industry for successful launches of the MRSAM-Army and said the successful launches had once again proven the reliability of the system.

TASL missile launcher for MRSAM

Tata Advanced Systems Ltd (TASL) produced missile launcher that was successfully tested during the missile trials held on 27 March 2022 for the Medium-Range Surface-to-Air Missile system (MRSAM-Army) at Integrated Test Range (ITR), Chandipur in Odisha.

Contract with L&T for two MPVs for Indian Navy

Ministry of Defence signed a contract on 25 March 22 with Larsen and Toubro Ltd. for acquisition of two Multi-Purpose Vessels (MPVs) for Indian Navy at an overall cost of Rs.887 Crore under "Buy-Indian" Category. The contract was signed in the presence of VAdm SN Ghormade, Vice Chief of the Naval Staff and Pankaj Agarwal, Additional Secretary and Director General Acquisition. Delivery of vessels is scheduled to commence from May 2025.

MPVs will be the first of its kind platform, constructed to provide a cost-effective solution to meet a variety of requirements of Indian Navy. These vessels, to be built by L&T shipyard at Kattupally (Chennai), will perform multi-role support functions such as maritime surveillance and patrol, launching/ recovery of torpedoes and operation of various types of aerial, surface and underwater targets for Gunnery/ASW firing exercises.

IAF in MoU with IIT Madras

The Indian Air Force and IIT Madras signed a MoU on 13 April 22 for various developmental projects to support the requirements of the IAF. The MoU was signed by Air Commodore S Bahuja, Command Engineering Officer (Systems), Headquarters Maintenance Command, IAF and Professor H S N Murthy, Head of Department Aerospace Engineering IIT Madras, at Air Force Station, Tughlakabad, Delhi. Joint Partnership between IAF and IIT Madras aims to accelerate IAF's indigenisation efforts for achieving 'Atma Nirbhar Bharat'. Under the ambit of MoU, IAF has identified key focus areas involving technology development and finding indigenous solutions towards sustenance of various weapon systems. IIT Madras will provide consultancy duly supported by research for feasibility studies and prototype development.

L&T constructs facility for DRDO in record 45 days

The Buildings Business of Larsen and Toubro has set a record by constructing the 7-storey, state-of-the-art Flight Control System (FCS) Integration Facility for the Defence Research and Development Organisation (DRDO) in just 45 days using Integrated Hybrid Modular Construction Technology (IHMCT). The facility was inaugurated on 17 March 2022, by the Minister of Defence, Government of India, Rajnath Singh in the presence of Basavaraj Bommai, Chief Minister of Karnataka, Dr G. Satheesh Reddy, Secretary Department of Defence R&D and Chairman, DRDO and other dignitaries.

GSL for construction of eight FPVs for ICG

Ministry of Defence has signed a contract with Goa Shipyard Limited (GSL) for construction of eight Fast Patrol Vessels for Indian Coast Guard at a total project cost of Rs 473 crore. The contract was signed by Joint Secretary (Maritime and Systems)

Dinesh Kumar and Chairman and Managing Director, GSL Cmde BB Nagpal (Retd) in New Delhi on 28 March 2022. These surface platforms will be indigenously designed, developed and manufactured by GSL under Buy (Indian-IDDM) Category. These eight high speed vessels will be based along the coast of India with capability to operate in shallow waters and enhance the security apparatus along the vast coast line.

Launching of GRSE's Indian Coast Guard FPV

Fast Patrol Vessel (FPV) Yard 2118 of the Indian Coast Guard, the 5th in the series of 5 FPVs built by Garden Reach Shipbuilders and Engineers (GRSE) was ceremoniously launched on 2 May 2022 at Titagarh, West Bengal. GRSE, Kolkata has undertaken construction of 36 ship construction projects for Coast Guard and 125 refits of Coast Guard ships in a span of 38 years.

The ship is 50 metres long and 7.5 metres wide with a displacement of around 308 tons and is designed for a maximum speed of 34 knots with an endurance of more than 1500 nautical miles. The ship is equipped with 3 Main Engines with advanced control systems, Water Jet units and an 'Integrated Bridge System' integrating all communication and navigation systems. The ship will be fitted with 30 mm 2A42 gun as main armament, and will also have modern habitability features with fully air conditioned modular accommodation for 35 personnel.

Keel laying of second ship - Diving Support Craft

The keel laying for the second ship of Diving Support Craft (DSC) project was held on 5 May 2022 at Titagarh Wagons Ltd., Kolkata. The contract for procurement of Five Diving Support Craft (Yards 325 to 329) for the Indian Navy was signed on 12 Feb 2021 with Titagarh Wagons Ltd., at a total project cost of Rs 174.77 Cr. On commissioning, these craft will provide diving assistance

for IN ships inside and close to harbour, for underwater repairs, maintenance and salvage. The DSCs will be fitted with state-of-the-art diving equipment and tools for performing diving operations.

Inauguration of ICG Jetty at Fort Kochi

Indian Coast Guard has made a significant presence on all along the Indian coastline and plays a dominant and effective role in internal security and maritime law enforcement. Kochi is one of the major ports of India in the Southern Region and the Coast Guard District Headquarters No.4 (Kerala and Mahe) at Kochi plays a paramount role in providing safety and security in sea areas of Kerala and Lakshadweep Islands.

Cochin Port Trust has constructed an ICG Jetty (220 mtrs X 15 mtrs) in the harbour with a maintained depth of 7 mtrs and the same would facilitate swift deployment of Indian Coast Guard ships. With the hub of maritime activities growing manifold at Kochi, Indian Coast Guard have increased its assets and as on 4 OPVs, 3 FPVs, 2 IBs and 2 Auxiliary Barges are based at Kochi.

Eastern Fleet Golden Jubilee Celebrations

The Eastern Fleet commemorated its Golden Jubilee on 6 and 7 April 2022 at Visakhapatnam with a host of events. The Fleet Awards Function 2022 which recognises achievements and excellence achieved by various units of the Eastern Fleet in 2021-22 was held on 7 April 2022 to coincide with the Golden Jubilee celebrations. Admiral R Hari Kumar, Chief of the Naval Staff was the Chief Guest for the Awards Function hosted by Rear Admiral Sanjay Bhalla, Flag Officer Commanding Eastern Fleet. INS Shivalik was adjudged as the Best Ship of the Eastern Fleet. INS Kadmatt was adjudged as the Best Corvette, and the Most Spirited Ship trophy was awarded jointly to INS Satpura and INS Kora.

Initiative to speed up IAF convoy movements

Indian Air Force in collaboration with Indian Oil Corporation Limited (IOCL) has taken a leap forward in fuel supply chain management by introducing a 'Fleet Card - Fuel on Move' for its varied fleet of vehicles. This innovative initiative taken by the Indian Air Force provides a paradigm shift to the logistics management of fuel. HQ Western Air Command was earmarked as lead agency in the implementation and execution of this innovative concept of "Fuel on Move". Availability of Fleet Card will permit the convoy to refuel at any IOCL fuel stations thus increasing the pace of movement and reducing the lead time for readiness at operational locations across the nation.

Army Medical Corps celebrates 258th Raising Day

The Indian Army celebrated 258th Raising Day of Army Medical Corps on 3 April 2022. The Corps has the motto of "Sarve Santu Niramaya" meaning "Let all be free from disease and disability". It has excelled in providing both peace time and combat health care to the defence forces, medical services to UN peace keeping forces in foreign missions and during disaster management to civil authorities. To commemorate the occasion, Vice Admiral Rajat Datta, Director General of Armed Forces Medical Services and Lieutenant General Daljit Singh, Director General of Medical Services (Army) along with Directors General of Medical Services of (Navy) and (Air) laid wreaths at the National War Memorial and paid tributes to medical personnel who have made the supreme sacrifice in the line of duty.

Thales and CMTI MoU for advanced collaborative research

Reiterating its goal to foster innovation in the country, Thales has signed a Memorandum of Understanding (MoU) with the Central Manufacturing Technology Institute (CMTI) of India for advanced collaborative research and development in the field of Open Hardware. This partnership will involve the designing of micro-processors using open-source assets which will enable the indigenous development of hardware and complete control of the behaviour of the processor tailor-made to software applications, which is not doable with proprietary hardware.

The MoU was signed in the august presence of Union Minister for Heavy Industries, Government of India, Dr. Mahendra Nath

Pandey and Minister of State for Heavy Industries, Government of India, Krishan Pal Gurjar, and Thales VP Technical Operations Philippe Valery, Thales VP and Country Director – India Ashish Saraf and CMTI Director Dr Nagahanumaiah and other dignitaries from the Ministry.

TIDCO and GE to establish CoE

GE Aviation has partnered with Tamil Nadu Industrial Development Corporation Ltd. (TIDCO) to set up a Centre of Excellence (CoE) in emerging technologies. Governed by the special purpose entity (SPV) of TIDCO, the CoE aims to create an ecosystem of advanced research and development using additive technologies. The CoE will work towards technology development of aviation engine parts such as compressor heat exchangers, combustor components, casing, frames, gears, and splines. It will also take up projects in development of predictive analytical solutions for additive manufacturing (AM) for industry 4.0. The CoE will aim to develop Indian intellectual property for the AM technologies including materials, machines, design software to provide specific technology solutions.

MoU between Indian Navy and L&T

A Memorandum of Understanding (MoU) was signed on 20 April 2022 between Indian Navy (IN) and Larsen and Toubro (L&T). The MoU aims to engage L&T as a Knowledge Partner for nurturing technologies in various domains, for induction into the Indian Navy. Further, the MoU aims to bring together IN and L&T to collaborate on innovative and pioneering projects related to contemporary and emerging technologies of mutual interest. The MoU encompasses all the aspects related to Electrical, Weapon, Engineering, Machinery and Control, and Hull of a Naval Warship.

President's Colours for units of the Dogra Regiment

General MM Naravane, Chief of the Army Staff presented the prestigious 'President's Colours' to two battalions of the Dogra Regiment, namely 20 DOGRA and 21 DOGRA during an impressive Colour Presentation Parade held at the Dogra Regimental Centre, Faizabad (UP) on 24 March 2022. After reviewing the parade, the Army Chief appreciated the rich traditions of the Dogra Regiment in all spheres of military activities to include operations, training and sports. The COAS also complimented the newly raised units for their remarkable performance within a short period of time and conveyed his best wishes to all ranks to serve the Nation with pride.

President's Colour for INS Valsura

Ram Nath Kovind, the President of India presented the prestigious President's Colour to INS Valsura on 25 March 2022. The 'Nishan Adhikari' Lt Arun Singh Sambyal received the President's Colour on behalf of the unit in an impressive parade. The unit paraded a 150 man Guard of Honour for the President of India. Over 800 officers and men of INS Valsura, looking spectacular in their ceremonial dresses, marched proudly to the tunes of the Naval Band

The legacy of INS Valsura dates back to 1942, when the operational necessity mandated creation of an advanced Torpedo Training Facility to enhance the firepower of the Royal Indian Navy during World War-II. Post India becoming a Republic, the unit was renamed as INS Valsura on 1 July 1950.

IAF Commanders' Conference

The Raksha Mantri (RM), Rajnath Singh, inaugurated the Air Force Commanders' Conference (AFCC) at Air Headquarters in New Delhi on 6 April 2022. The conference was attended by Raksha Rajya Mantri, Ajay Bhatt and Defence Secretary Dr Ajay Kumar, along with senior commanders of the Indian Air Force. He covered the challenges being faced on the Northern and Western borders and expressed his satisfaction in the way Indian Armed Forces have been able to respond to emerging situations.

Naval Commanders' Conference

The first edition of Naval Commanders› Conference of 2022 was organised from 25 to 28 April 2022. The Conference serves as a platform for Naval Commanders to discuss important maritime matters at the military-strategic level as well as interact with Senior Government functionaries through an institutionalised forum. During the Conference, Raksha Mantri Rajnath Singh and External Affairs Minister, S Jaishankar addressed and interacted with the

Naval Commanders on matters pertaining to the national security. The Chiefs of Indian Army and Indian Air Force also interacted with the Naval Commanders to address convergence of the three Services vis-à-vis a common operational environment, as well as discussed avenues of augmenting Tri-Service synergy and readiness.

Naval Investiture Ceremony 2022

The Naval Investiture Ceremony 2022 to felicitate naval personnel who have demonstrated gallant acts, leadership, professional achievements and distinguished service of high order was conducted at Naval Base, Kochi on 4 May 2022. Adm R Hari Kumar, Chief of the Naval Staff (CNS) on behalf of the President of India, confered the Gallantry and Distinguished Service awards to the recipients during the investiture ceremony. During the ceremony, 31 awardees including 6 Nao Sena Medals (Gallantry), 8 Nao Sena Medals (Devotion to Duty), 17 Vishisht Seva Medals were presented with medals. In addition, Sarvottam Jeevan Raksha Padak, Lt VK Jain Memorial Gold Medal, Capt Ravi Dhir Memorial Gold Medal, CNS Trophy for best Green Practice and Unit Citations were also presented.

IndiGo first to use GAGAN

IndiGo has become the first airline in Asia to conduct Localiser Performance with Vertical Guidance (LPV) Approach. IndiGo conducted the LPV approach on its ATR 72-600 aircraft, equipped with GAGAN, at Kishangarh Airport (Ajmer) on 28 April 2022. This test flight was a part of the approval process with DGCA, which includes training of pilots, validation of approach, simulator sessions amongst others. GAGAN an acronym for GPS Aided

GEO Augmented Navigation is an indigenously developed Space Based Augmentation System (SBAS), jointly established by ISRO and AAI to provide lateral and vertical guidance on an approach, approximating the accuracy of a Category I ILS.

IndiGo ranked 6th largest by passenger volume

IndiGo has been ranked the 6th largest airline by passenger volume in the OAG Frequency and Capacity Statistics for March 2022. According to the report, IndiGo had carried more than 2.02 million passengers in the month, as per data collected till 28 March 2022, which is the highest for any carrier in Asia. OAG also called out IndiGo as the fastest growing airlines in the world, with a frequency increase of 41.3 per cent in the month.

Virgin Atlantic announces second daily service

Virgin Atlantic has announced a new second daily service to Delhi's Indira Gandhi International Airport, commencing on 1 June 2022. June onwards, the airline will offer a morning as well as a night departure from Delhi to London offering more choice to customers travelling for both business and leisure between India and UK's capital cities. VA will be using Boeing B787-900s with 31 Upper Class, 35 Premium and 192 Economy Delight, Classic and Light seats.

(Photo: Mark Harkin)

IndiGo announces 100 domestic flights

In its bid to strengthen connectivity, IndiGo has launched its summer schedule including 100 flights connecting key metro and regional cities in India, starting from 27 March 2022. With its fleet of 275+ aircraft, the airline is operating over 1500 daily flights and connecting 73 domestic destinations and 24 international destinations.

Vistara first Indian airline to introduce RFIDAeroCheck

Vistara recently announced its partnership with Aerospace Software Development (ASD) and became the first scheduled Indian airline to deploy RFIDAeroCheck technology as part of its commitment to maintaining highest safety standards. ASD's RFIDAeroCheck will track the presence and expiration of emergency equipment on the airline's entire fleet of Airbus and Boeing aircraft.

SpiceJet statement on settlement

"With regard to the dispute pending between Credit Suisse and SpiceJet Limited, we would like to inform that the parties have now reached an in-principle commercial settlement of the dispute and the process of documentation is underway", according to their press statement. The settlement with Credit Suisse follows SpiceJet's successful settlements with De Havilland Aircraft of Canada Limited (DHC), Boeing, aircraft lessors CDB Aviation and Avolon. "SpiceJet had already deposited $5million on the direction of the Madras High Court in the Credit Suisse case and there is no adverse financial liability on the Company. The settlement involves payment of settlement amount over a mutually agreed period of time".

SVPIA sets a national record in runway work

Sardar Vallabhbhai Patel International Airport (SVPIA), managed by the Adani Group, has completed the recarpeting work on its 3.5-kilometre-long runway in a record time of 75 days. This duration is an all-time best among brownfield runways in India. Ahmedabad›s SVPIA is the busiest airport in Gujarat with over 200 flights every day in the pre-Covid time. The challenge of recarpeting the runway without impacting the operations of scheduled flights was tackled by Adani Airport Holdings Ltd (AAHL) by using only nine hours of NOTAM (Notice to Airmen) daily. In addition to other upgrading works completed at SVPIA, the airport now has a complete airfield lighting system in runway and connecting taxiways that is equivalent to lighting an entire district of 12 to 14 villages.

IAF prepares Bagdogra airfield for civil air operations

The Indian Air Force has carried out extensive resurfacing work on the runway of Bagdogra airfield enabling civil aircraft to resume operations from the morning of 26 April 2022. The first civil aircraft landed there on 26 April 2022 at around 08:00 am. The resurfacing on central bituminous portion of the runway has been completed on schedule. The runway was closed for two weeks for laying three flexible (bituminous) layers, reconstruction of non-load bearing surfaces etc. The work was executed with Border Roads Organisation (BRO) as the implementing agency and was completed expeditiously to facilitate civil aircraft operations with "least inconvenience to the airlines and passengers".

Shillong is 8th destination in Northeast for flybig

flybig, India's newest airline, has been on a rapid expansion mode ever since its flight operations began in January 2021. On 2 May 2022 Shillong became the 8th destination for flybig in the North East of India after 4 cities in Assam, 2 cities in Arunachal Pradesh and 1 city in Tripura.

APPOINTMENTS

Gen Manoj Pande is Chief of the Army Staff

General Manoj Pande took over as the 29th Chief of the Army Staff on 30 April 2022 from General Manoj Mukund Naravane, who superannuated after four decades of an illustrious career.

The General officer is alumnus of the National Defence Academy and was commissioned in December 1982 in the Corps of Engineers (The Bombay Sappers). He has commanded an Engineer Regiment during Operation PARAKRAM in the sensitive Pallanwala Sector of Jammu and Kashmir, along the Line of Control. The General Officer is a graduate of Staff College, Camberley (United Kingdom) and attended the Higher Command and National Defence College Courses.

Lieutenant General Baggavalli Somashekar Raju is new Vice Chief of the Army Staff

Lieutenant General Baggavalli Somashekar Raju took over as the Vice Chief of the Army Staff on 1 May 2022. An alumnus of Sainik School Bijapur and National Defence Academy, he was commissioned in the JAT Regiment on 15th December 1984. He commanded his battalion during Op Parakram in the Western Theatre and in Jammu and Kashmir. He also holds the distinction of commanding the Uri brigade along the Line of Control, a Counter Insurgency Force and the Chinar Corps in the Kashmir Valley. The General Officer also served as the Commandant, Indian Military Training Team in Bhutan.

Vice Admiral Sanjay Mahindru assumes charge as Deputy Chief of Naval staff

Vice Admiral Sanjay Mahindru assumed charge as Deputy Chief of the Naval Staff on 31 March 22. Vice Admiral Sanjay Mahindru is an alumni of the National Defence Academy, Khadakvasla. He was commissioned into the Indian Navy on 1 January 85 and is a Submarine and Navigation Specialist. In his career spanning over 37 years, he has held a variety of Command and Staff appointments both ashore and afloat.

Rear Admiral Vikram Menon takes over as FOGA

Rear Admiral Vikram Menon took over duties of Flag Officer Commanding Goa Area (FOGA) and Flag Officer Naval Aviation (FONA) on 30 April 2022 from Rear Admiral Philipose G Pynumootil who retired on superannuation after a career spanning over 36 years in service. Rear Admiral Menon is an alumnus of the National Defence Academy and the Naval War College and was commissioned into the Indian Navy on 1 January 1990. An experienced fighter pilot and Qualified Flying Instructor with over 2000 hours of flying experience, he has flown the Sea Harrier aircraft extensively from INS Viraat.

Air Marshal Sanjeev Kapoor is Director General (I&S)

Air Marshal Sanjeev Kapoor assumed the appointment of Director General (Inspection and Safety) of Indian Air Force at Air HQ New Delhi on 1 May 2022. The Air Marshal is a graduate of National Defence Academy and was commissioned in the Flying branch of IAF in December 1985 as a Transport Pilot. He is an alumnus of Defence Services Staff College (DSSC) Wellington, College of Defence Management and National Defence College. The Air Officer is a Qualified Flying Instructor with more than 7700 hours of flying experience on various aircraft in the inventory of IAF.

Saab appoints Mats Palmberg as India Head

Mats Palmberg, earlier Head of Saab's Gripen India Campaign and Vice President of Industrial Partnerships at Saab, has now taken over as the new Chairman and Managing Director of Saab India Technologies Pvt. Ltd (SITPL) from 1 May 2022. Mats already has many years of experience working across the Indian defence and aerospace industry at all levels. As the leader of Saab's Gripen campaign in India he has been a strong advocate for Saab's commitment to Make-in-India and Atma Nirbhar Bharat. Mats' predecessor, Ola Rignell, has taken over new responsibilities within Saab in Sweden after his successful time spent expanding Saab's presence in India.

Sudhakar T N is new Chairman and Managing Director, GSL

Sudhakar T N took over additional charge as Chairman and Managing Director of Goa Shipyard Limited (GSL) on demitting of office of the CMD, GSL by Cmde B B Nagpal, NM, IN, (Retd). Sudhakar T N started his career with Bharat Heavy Electrical Ltd, EPD, Bangalore. After serving BHEL for two years he joined Cochin Shipyard Ltd (CSL). He has held various positions in Finance Wing of CSL and was in the service of CSL for 28 years. Prior to leaving CSL he was working as General Manger (Finance). He left CSL and joined Goa Shipyard Ltd (GSL) on 1 Feb 2016 as Director (Finance).

Just in!

Brahmos-ER launched from IAF Su-30MKI

India on 12 May 2022 successfully fired the Extended Range version of BrahMos air launched missile from an IAF Su-30 MKI aircraft. The launch was as planned and the missile achieved a direct hit on the designated target in the Bay of Bengal region. With this, the IAF has achieved the capability to carry out precision strikes from Su-30MKI aircraft against a land/ sea target over very long ranges.

News from HAL

FY 2021-22: HAL scales new peak

HAL recorded its highest ever revenue of over Rs. 24,000 crores (provisional and unaudited) for the financial year ended on 31 March 2022 registering a 6% revenue growth over the previous financial year. The corresponding figure for the previous year stood at Rs. 22,755 crores.

HAL pays highest dividend to GOI

HAL has paid the second interim dividend of Rs. 653.36 crores for the FY 2021-22 to the Government of India. The dividend cheque was handed over to the Defence Minister, Mr. Rajnath Singh by Mr. R. Madhavan, CMD, HAL and Mr. C. B. Ananthakrishnan, Director (Finance), HAL in the presence of Dr. Ajay Kumar,

"Despite the challenges of the second wave of Covid-19 during the first quarter of the year and the consequent production loss, the Company could meet the targeted revenue growth with improved performance during the balance period of the year", stated Mr. R. Madhavan, CMD, HAL.

The second wave of Covid-19 had compelled the Company to declare a phased lockdown at various Divisions during April and May 2021. The employees had put in additional hours in June and July 2021 to compensate for the loss of man hours due to the lock down.

Further, based on the improved financial performance and cash flow position, the Credit Rating Agencies CARE Ratings and ICRA Limited have upgraded the Company's credit rating from AA+ Stable to AAA/Stable during the financial year.

HAL achieved record revenue with production of 44 new helicopters/aircraft, 84 new engines, overhauling 203 aircraft/ helicopters and 478 engines.

Recently, HAL bagged a contract for production of 15 Light Combat Helicopters (LCH), 10 for IAF and five for the Indian Army at a cost of Rs 3,887 crores along with Infrastructure sanctions worth Rs. 377 Crores.

Considering the improved financial performance during the financial year, HAL paid an interim dividend of Rs. 40 per share representing 400% on the face value of Rs. 10 per share during FY 2021-22.

Defence Secretary in Delhi. "It is the highest dividend declared by the Company after listing of its shares on the Stock Exchange(s) and is more than what has been prescribed under DPE guidelines", stated Mr R. Madhavan. Mr. Sanjay Jaju, AS (DP), Mr. Chandraker Bharti, JS (Aero), MoD and Mr. Alok Verma, Director (HR), HAL were also present on the occasion.

HAL and Israel Aerospace Industries sign MoU for MMTT

In a move aimed at bolstering the 'Make in India' campaign, HAL entered into an MoU with Israel Aerospace Industries (IAI) on 6 April 2022 to convert Civil (Passenger) aircraft to Multi Mission Tanker Transport (MMTT) aircraft in India. Under the pact signed recently, HAL will convert pre-owned Civil (Passenger) aircraft into air refueling aircraft with cargo and transport capabilities. The move will provide India's defence ecosystem with new capabilities and cost effective solutions in the market. The MoU will facilitate HAL and IAI's decades, long expertise in developing, manufacturing and producing leading defence platforms. The scope of MoU also covers "passenger to freighter aircraft" conversion along with MMTT conversions.

A formal Memorandum of Understanding (MoU) was signed in Delhi by Mr D. Maiti, CEO (MiG Complex), HAL and Mr Yaacov Berkovitz, VP & GM Aviation Group, IAI in the presence of Mr Chandraker Bharati, JS (Aero), MoD.

"We are glad to join hands with our long standing partner IAI in this venture of MMTT conversion business which is one of the strategic diversification avenues identified by HAL", stated Mr R. Madhavan, CMD, HAL.

Boaz Levy, President IAI and CEO in his message said "We are proud to come together with our counterparts to bring our best value MMTT solution in India, while utilising local resources to manufacture and market the platform. By collaborating with HAL and bringing conversion directly to India, we are supporting the 'Make in India' campaign".

HAL hands over Gaganyaan hardware to ISRO

HAL has and will continue to play a significant role in India's current and future space programme including the Gaganyaan manned mission to space, given the skills and knowledge base within the company said Mr. S. Somanath, Chairman ISRO. He identified indigenisation and cost reduction as major challenges in the space missions and said apart from HAL private players will have a role in achieving these goals. He was speaking at the handing over function of the first set of Gaganyaan hardware by HAL to ISRO and at the inauguration of HAL's PS2/GS2 stage integration facility on 4 April 2022. HAL also handed over 150th Make Satellite Bus Structure on this occasion.

HAL commences main airframe fatigue test of LCA Mk1

HAL has commenced the Main Airframe Fatigue Test (MAFT) of LCA Mk1 airframe at its Ground Test Centre of the Aircraft Resyearch and Design Centre (ARDC) in Bengaluru.

The MAFT test facility was inaugurated by Mr. Arup Chatterjee, Dir (Engg. and R&D), HAL. Mr. R Madhavan, CMD, HAL and Dr. Dheodhare expressed their satisfaction on timely commencement of the MAFT testing. AVM Raju cited the importance of the commencement of the MAFT testing towards clearance of the full life of LCA fleet and urged the team to keep up the momentum to ensure that the continuous flying requirements of IAF are met.

As per the military airworthiness requirements, MAFT has to demonstrate the capability of the airframe to withstand four times the service life. These tests will be carried out on the LCA (Air Force) Mk1 airframe over a period of eight to nine years. The successful completion of MAFT will qualify the LCA (Air Force) Mk1 airframe for its full-service life.

The test plan and schedule for the MAFT has been jointly arrived at by the designers from HAL and scientists from Aeronautical Development Agency (ADA) in coordination with the Regional Centre for Military Airworthiness (RCMA), CEMILAC. The testing and inspection will be carried out by ARDC under the supervision of DGAQA with the participation of designers from ARDC and ADA.

HAL and Do-228

In early April 2022, HAL delivered the first passenger version Do-228 aircraft to the Government of Mauritius. Additionally, HAL delivered the first civil Do-228 aircraft under UDAN scheme for deployment in the State of Arunachal Pradesh by Alliance Air.

HAL and BEL sign contract for indigenous IRST

HAL and BEL signed a contract for co-development and co-production of Long Range Dual Band Infra-Red Search and Track System (IRST) for Su-30 MKI on 26 April 2022 under the MAKE-II procedure of Defence Acquisition Procedure (DAP) 2020, as part of the 'Make in India' initiative.

The proposed IRST system will be a high end strategic technology product in the field of defence avionics and technically competitive to existing IRST system in the global market with features of Television Day Camera, Infrared and Laser sensors in single window for air to air and air to ground target tracking and localisation. The system will enhance the Indian Air Force's air superiority.

Mr Suneel Kumar Srivastava, GM, HAL (Korwa) and Mr. Loyola Pedro Vianney G., GM, BEL (Chennai) signed the contract. Mr. Arup Chatterjee, Director, Engineering and R&D (HAL) and Mr M V Rajasekhar, Director, R&D (BEL) were present on the occasion.

The joining hands of two defence PSUs for development of technologically critical IRST gives impetus to Atmanirbhar Bharat in the defence sector. This initiative also opens the future path in the field of indigenous defence manufacturing for development of high end strategic technology product of IRST for various platforms in global competitive environment.

HAL contract with Nigerian Army for Phase II training

HAL signed a contract with Nigerian Army for imparting Phase-II flying training on Chetak Helicopter for six officers of Nigerian Army Aviation. This marks the continuation of contract signed in April 2021 for imparting Phase-I flying training to six Nigerian Army aviation officers, which was successfully executed in December 2021. The Phase-II flying training on Chetak Helicopter is scheduled to commence soon and is planned to be completed by December 2022. As part of the training, 70 hours flying training would be imparted for each Nigerian Army Aviation Officer.

The contract was signed by Mr. BK Tripathy, General Manager, Helicopter Division and Commodore Anthony Victor Kujoh, Defence Adviser, High Commission of Nigeria in India at a programme held at Helicopter Division. Mr Tripathy said the platforms such as ALH and LUH, with wide range of capabilities can be of great strength for the Nigerian Army. "Nigeria would not only like to further enhance the business relationship with HAL for training, but also towards asset acquisition", stated Cmdre Kujoh.

News from BEL

Record turnover of Rs. 15,000 crores

Bharat Electronics Limited (BEL) has achieved a turnover of about Rs.15000 cr (Provisional and Unaudited), during the Financial Year 2021-22, against the previous year's turnover of Rs. 13,818 cr, despite challenges posed by the COVID-19 pandemic and global semiconductors shortage.

BEL's order book as on 1 April 2022, is around Rs. 57000 cr. In the year 2021-22, BEL secured significant orders worth (approx.) Rs.18000 cr. Some of the major orders acquired during the year were Avionics Pack for Light Combat Aircraft (LCA), Advanced Electronic Warfare Suite for Fighter Aircraft, Instrumented Electronic Warfare Range (IEWR), Electronic Voting Machine (EVM) and Voter Verifiable Paper Audit Trail (VVPAT), Cdr TI-T90 Tank, COMINT System, Radar Warning Receiver (RWR) and Missile Approach Warning System (MAWS) for C-295 Programme, Electronic Gun, IoT Gateway, etc.

Some of the flagship projects executed during FY 2021-22 were Missile Systems (Air Defence Weapon System and LRSAM), Command and Control Systems, Communication and Encryption products, various Sonars, Electro-optic Systems, Fire Control Systems, Gun Upgrades, various Radars, Electronic Warfare Systems, Coastal Surveillance System, Un-manned Systems, Home Land Security Systems, Smart City projects, K-FON, Medical Electronics, etc.

BEL achieved export sales of around US$ 32.26 Million during FY 2021-22. Major products exported included Coastal Surveillance System, Trans-Receive (TR) Modules, EO-IR Payload System, Compact Multi-Purpose Advanced Stabilization System (EOS CoMPASS), Solar Hybrid Power Plant, Data Link, Electro-Mechanical parts, Low Band Receivers (LBREC), Medical Electronics, Spares for Radars, etc.

Expansion activities at BEL

As part of expansion of the existing unit, BEL has taken up establishment of an Advance Night Vision Products Factory in Nimmaluru Village, Pamarru Mandal, Krishna District of Andhra Pradesh in an area of around 50 acres, to cater to the futuristic requirements for Night Vision Products. The new factory is likely to create direct and indirect employment for around 500 people.

BEL signs contracts worth Rs. 3,102 cr with MoD

India's Ministry of Defence (MoD) has signed two contracts worth Rs. 3,102 crores with the Bengaluru and Hyderabad Units of Bharat Electronics Limited (BEL). The MoD and BEL-Bengaluru concluded a contract for supply of Advanced Electronic Warfare (EW) suite for fighter aircraft of the Indian Air Force. The overall cost of the contract is estimated to be Rs. 1,993 crores.

The supply of advanced EW systems will significantly enhance the battle-survivability of IAF fighter aircraft while undertaking operational missions against adversaries' ground-based as well as airborne fire control and surveillance radars. The EW suite has been indigenously designed and developed by Defence Research and Development Organisation (DRDO).

The MoD also signed a contract with BEL-Hyderabad for Instrumented Electronic Warfare Range (IEWR) for the Indian Air Force. The contract is a significant step towards enhancing the capabilities of IAF to prepare for future warfare. The overall cost of the contract is estimated to be Rs. 1,109 crores. The IEWR will be used to test and evaluate airborne Electronic Warfare (EW) equipment and validate their deployment in an operational scenario.

BEL and Army Design Bureau sign MoU

Bharat Electronics Limited (BEL) signed a Memorandum of Understanding (MoU) with the Army Design Bureau of Indian Army for collaboration in the field of Artificial Intelligence (AI) for Defence applications on 30 March 2022. The MoU seeks to bring together the Indian Army, ADB and BEL under one roof to jointly carry out research activities for the development of innovative AI solutions for the Indian Army. BEL and ADB will co-develop AI based projects for the Indian Army.

60 years of Chetak service

(Photo: MoD)

The Chetak helicopter in the inventory of the Indian Armed Forces has completed 60 years of glorious service to the Nation.

"Safety and security of the country is Government's top priority and all efforts are being made to safeguard its unity and integrity," stated Raksha Mantri Mr. Rajnath while addressing a conclave organised to commemorate 60 years of Chetak helicopter's service to the Nation. The conclave was organised by the Indian Air Force at Air Force Station, Hakimpet in Hyderabad on 2 April 2022. Chief of the Air Staff Air Chief Marshal VR Chaudhuri, senior retired and serving officers of the helicopter stream from the three services and officials of Ministry of Defence, Indian Coast Guard and Hindustan Aeronautics Limited (HAL) were present on the occasion.

The Raksha Mantri described the conclave as a fitting tribute to those who have served the Nation with hard work and dedication. Paying his respects to this invaluable contribution, he said, "Whenever a country fights a war for the safety and security, it is not just the Armed Forces who take part. The whole nation fights that war. The scientists, engineers and technicians of organisations like HAL, who develop helicopters like Chetak and other platforms, play an equally important role as our soldiers. Lakhs of employees and workers associated with MSMEs also contribute by supplying parts to these projects. This conclave celebrates the hard work and dedication of all of them".

(Photo: Army PRO)

Comparing Chetak named horse of Rajput king Rana Pratap, Mr. Rajnath Singh described the Chetak helicopter as not just a machine, but a vibrant and dedicated entity which has been continuously engaged in the service of the nation for the last six decades and has set an example for others. He noted that nearly 700 Chetaks manufactured so far have served the nation in war and peace with full dedication, describing its multi-service employment as a shining example of jointness.

Elaborating on the capabilities of the helicopter, the Raksha Mantri stated, "Chetak has proved its mettle in the battlefield by targeting enemies with accuracy and successfully landing troops. It has also helped in delivering essential logistics. It has saved precious lives through its evacuation efforts in case of emergency. It has provided important information whenever needed, which has helped in decision making and paving way for victory in wars. Chetak has always been at the forefront in providing humanitarian aid and disaster relief during natural calamities. This is the first time a platform has reached this stage." He appreciated the fact that Chetak, through adaptation, modification and upgradation, remains a frontline platform even after 60 years of its creation.

Mr. Rajnath Singh recalled the extraordinary contribution of the Chetak helicopter during the 1971 war. "From providing air support to ground troops to heli-bridging operations and destroying enemy positions, our air warriors onboard, Chetak showed exemplary courage and professionalism during the war. The helicopter was also used to train the pilots of Mukti Bahini. Chetak's role can also be seen as a shining example of promoting integration and jointmanship. Our victory in the war has been written in golden letters in the history books. Neither did we want any power, land, resources, nor any domination. We fought that war to protect humanity and democracy," he stated.

The Raksha Mantri was of the view that India has shown its strength in the design, development and operation of helicopters

in the five-tonne category, terming the indigenously designed and developed Advanced Light Helicopter Dhruv and its variants as examples of India's prowess. He described the Light Combat Helicopter as another example of the country's capability in light helicopters for combat operations. Light Utility Helicopters, being operated by the Armed Forces, are also great examples of the capability in the helicopter sector, he added.

The Defence Minister stressed on the need to march forward in the design and development of the 10-tonne Indian Multirole Helicopter which, he said, is a significant requirement for the Armed Forces and has a huge market potential. He called to fast-track the design and development of helicopter technology in

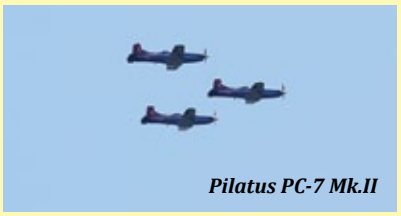
IAF commemorates 60 years of Chetak

AJT Hawk Mk.132

The veteran Kiran's

Chetak's

Chief of the Air Staff, Air Chief Marshal VR Chaudhari presenting memento to Raksha Mantri Mr. Rajnath Singh during a conclave organised to commemorate 60 years of Chetak helicopter's service to the Nation, in Hyderabad on 2 April 2022



Pilatus PC-7 Mk.II

The Chief of the Air Staff, during his inaugural address, acknowledged the immense contributions by the Chetak in all conflicts since its induction in 1962, as well as its peacetime effort all across the country, including the Siachen glacier. The Defence Minister witnessed the photo exhibition showcasing sixty years of glorious service of Chetak helicopter and interacted with Armed Forces veterans and other dignitaries who were present at the Conclave.

Celebrating the event, a fly-past by 26 aircraft including Chetaks, Pilatus, Kirans, Hawks, Advanced Light Helicopters and a Light Combat Helicopter was an eye catcher for everyone. The finale was a diamond formation fly past by eight Chetak helicopters, the machine which continues to render yeomen service across the length and breadth of the country. This magnificent machine still operates across all the terrains and is the basic training helicopter for pilots of the three Services.

Sarangs, LCH and the Chetak

the country, terming it is one of the dual-use technologies which will not only prove to be effective in the defence sector, but will make India a dominant force in the helicopter market. "According to an estimate, there is a demand for more than 1,000 civilian helicopters in the country and an equal number of helicopters in the defence sector. We need to exploit this huge potential in the helicopter market. In addition, we need to make efforts to strengthen India's claim in the rotary wing domain. The era is changing. I am sure that in the times to come we will be more bright, strong and completely self-reliant," he added.

The Raksha Mantri reiterated the Government's resolve of achieving Aatmanirbharta in defence production and preparedness, in view of the constantly changing global security scenario. "These days, there have been challenges in ensuring supply lines. External situation has affected the serviceability of critical weapons and equipment. Therefore, we are leaving no stone unturned to achieve self-reliance. Earlier, the country was dependent on imports from other countries to bolster the defence sector. This Government believes in strengthening our own shoulders to protect ourselves. We are making sure that India is not dependant of anyone," he stressed.

Mr. Rajnath Singh, however, maintained that by being strong, India does not mean to establish dominance in the world. He said, India has always followed the path of truth, non-violence and peace and does not support aggression of any kind. He stressed that the relationship between peace, security and military power has deepened in the country in the last few years. Underlining the importance of a strong security apparatus for nations to maintain peace in the world, he stated that in the last few years the Government has created an environment which has enabled the Armed Forces, scientists and defence manufacturers to think pro-actively and move forward on the path of making India strong and self-reliant.

The Raksha Mantri spoke on the major role domestic industry can play in achieving Aatmanirbhar Bharat as envisioned by Prime Minister Narendra Modi. "Free technology is being transferred to the private companies by DRDO. FDI limit has also been increased. Two positive indigenisation lists of defence items have been issued, while the third list will be out soon," he said, listing out the measures being taken by the Government to encourage the participation of the private sector. He pointed out the huge positive response from the three services, research and development organisations and public and private sector industries. The MSMEs, start-ups, innovators and academia are together exploring new avenues of defence production, he said, exuding confidence of unprecedented response to the unprecedented steps taken by the government.

The conclave was organised to provide a platform to showcase six decades of helicopter operations in the country, highlighting the operations of Chetak. The event comprised reflections, narrations and discussions by prominent speakers from the veteran community and the Services.

(All photos IAF PRO except where mentioned)

CCS approves procurement of 15 LCHs (LSP)

(Photo: Vayu)

The Cabinet Committee on Security (CCS) met under the Chairmanship of Prime Minister Narendra Modi on 30 March 2022 in New Delhi and approved procurement of 15 Light Combat Helicopter (LCH) Limited Series Production for the IAF and Indian Army at a cost of Rs. 3,887 Cr along with infrastructure sanctions worth Rs. 377 Cr.

The Light Combat Helicopter Limited Series Production (LSP) is an indigenously designed, developed and manufactured state of the art modern combat helicopter containing approximately 45% indigenous content by value which will progressively increase to more than 55% for SP Version.

This helicopter is equipped with requisite agility, maneuverability, extended range, high altitude performance and around-the-clock, all-weather combat capability to perform roles of Combat Search and Rescue (CSAR), Destruction of Enemy Air Defence (DEAD), Counter Insurgency (CI) operations, against slow moving aircraft and Remotely Piloted Aircraft (RPAs), high altitude bunker busting operations, Counter Insurgency operations in jungle and urban environments and support to ground forces and would be a potent platform to meet the operational requirements of Indian Air Force and Indian Army.

State of the art technologies and systems compatible with stealth features such as reduced Visual, Aural, Radar and IR

(Photo: Vayu)

(Photo: Phil Camp)

signatures and crashworthiness features for better survivability have been integrated in LCH for deployment in combat roles catering to emerging needs for next 3 to 4 decades. Several key aviation technologies like Glass Cockpit and composite airframe structure have been indigenised. The future Series Production version will consist of further modern and indigenous systems.

"Under the Atmanirbhar Bharat Abhiyaan, India is continuously growing in its capability to indigenously design, develop and manufacture advanced cutting edge technologies and systems in the Defence Sector. The manufacturing of LCH by HAL will give a further push to Atmanirbhar Bharat initiative and boost indigenisation of defence production and the defence industry in the country. Production of LCH will reduce import dependence for Combat helicopters in the country. Light Combat Helicopters are already in the import embargo list. With its versatile features built in for combat missions, LCH has export capability", stated MoD officials.

(Photo: IAF)

(Photo: IAF)

(Photo: IAF)

(Photo: IAF)

Landmark policy decision to indigenise 101 more weapons and platforms

Raksha Mantri Mr. Rajnath Singh released the third positive indigenisation list of 101 items, comprising major equipment/platforms, in New Delhi on 7 April 2022. The list, notified by Department of Military Affairs, Ministry of Defence (MoD), lays special focus on equipment/systems, which are being developed and likely to translate into firm orders in next five years. These weapons and platforms are planned to be indigenised progressively with effect from December 2022 to December 2027. These 101 items will, henceforth, be procured from local sources as per provisions of Defence Acquisition Procedure (DAP) 2020.

This development follows issue of first list (101) and second list (108) that were promulgated on 21 August 2020 and 31 May 2021 respectively. Import substitution of ammunition which is a recurring requirement has been given special emphasis. The spirit behind issuing these three lists comprising 310 defence equipment, slated to be manufactured locally, reflects the growing confidence of the Government in the capabilities of domestic industry that they can supply equipment of international standards to meet the demand of the Armed Forces. It is likely to stimulate the potential of indigenous Research & Development (R&D) by attracting fresh investment into technology and manufacturing capabilities. It will provide ample opportunities to the domestic industry for understanding the trends and future needs of the Armed Forces.

The third list comprises highly complex Systems, Sensors, Weapons and Ammunitions like Light Weight Tanks, Mounted Arty Gun Systems (155mmX 52Cal), Guided Extended Range (GER) Rocket for PINAKA MLRS, Naval Utility Helicopters (NUH), Next Generation Offshore Patrol Vessels (NGOPV), MF STAR (Radar For Ships), Medium Range Anti-Ship Missile (Naval Variant), Advance Light Weight Torpedo (Ship Launch), High Endurance Autonomous Underwater Vehicle, Medium Altitude Long Endurance Unmanned Aerial Vehicle (MALE UAV),

Third Positive Indigenisation List

Sl No.	Description
	With Effect from Dec 2022
1.	LORROS upto 30 Km
2.	Weapon Locating Radar (Plain Desert) upto 30 Km
3.	Upgrade for GRAD BM Vehicle
4.	Self Propelled Mine Burier
5.	Advance Infantry Floating Foot Bridge
6.	46M MLC-70 Modular Bridge
7.	Field Cipher Equipment
8.	APFSDS 125MM Practice Ammunition
9.	Cadet Training Ship
10.	Next Generation Offshore Patrol Vessel
11.	Intercom System for Ships & Submarines
12.	CLUB Missile Loader
13.	Diesel Engine Infrared Signature Suppression (IRSS)
14.	Gas Turbine Infrared Signature Suppression (IRSS)
15.	IAC Mod 'C' for Ships
16.	Link II Mod III for Ships & Submarines
17.	Naval Anti Drone System (NADS)
18.	Radar Finger Print System for ELINT Application
19.	SNF Gas Turbine Generator (GTG) Control System
20.	Deep Sea Side Towing Winch (DS4TW)
21.	Heavy Weight Torpedo Launchers for Ships
22.	VLF Communication Station
23.	Light Weight ESM System for small Ships
24.	3D C/D Band Radar for Ships
25.	MFSTAR for Ships
26.	COMINT (Ship Based)
27.	20 mm ammunition HE/I, HE/T & TPT
28.	Mobile Autonomous Launcher (Brahmos)
29.	Advance Light Weight Torpedo (Ship Launch)
30.	Ship Based Medium Range Surface to Air Missile (MRSAM)
31.	Global Navigation Satellite System (GNSS): Jammer System
32.	Global Navigation Satellite System (GNSS): Spoofing System
33.	Air to Ground Rocket 68mm
34.	MC2 Mission Computers for Mirage 2000 I/TI
35.	Hand Held Counter Drone System
36.	Counter Drone System (Hard Kill)
37.	Counter Drone System (Soft Kill)

with Effect from Dec 2023	
38.	Mini & Small Range UAV/Drone with Range of 100 Kms, Altitude of 4000m (Land Based)
39.	81 mm Anti Thermal Anti Laser (ATAL) Smoke Grenade
40.	Thermal Imaging (TI) Sight for AGS/AGL
41.	40mm Multi Grenade Launcher (MGL)
42.	5.56 x 45 mm (favor Ammunition)
43.	Naval Utility Helicopter (NUH)
44.	Helo Deck Communication System
45.	Aircraft Loader for MK 54 Torpedo and Harpoon Missile
46.	Stabiliser for Ships
47.	SSM Loader: 1241 RE & P 25 Class
48.	HF Transmitters 2KW
49.	Loitering Munitions (Land based range upto 150 Km)

Third Positive Indigenisation List

Sl No.	Description
With Effect from Dec 2024	
50.	Reflex Sight with Reticle for 40mm MGL & UBGL
51.	Spotting Scope System
52.	Marine Grade Aluminium Alloy Plates
53.	Anti Submarine Warfare (ASW) Sonar for Shallow Water
54.	Helicopter Visual Landing Aid System (HVLAS)
55.	Range Extension Kit (REK) for 250 Kg High Speed (HS) Bomb
56.	Range Extension Kit (REK) for 500 Kg General Purpose (GP) Bomb
57.	Long Range Weapon with IR Seeker (70-100KM)
58.	Chaff (1"x1"x8") & Flares (1"x1"x8") for Fighter Aircraft
59.	Flares (2"x1 "x8") for Fighter Aircraft
With Effect from Dec 2025	
60.	Mounted Artillery Gun System 155mm/ 52 Cal
61.	7.62mm x 54 (Sniper) Ammunition
62.	See Through Armour
63.	Light Weight Tanks
64.	155mm Terminal Guided Munition
65.	Guided Extended Range (GER) Rocket for Pinaka Multiple Launch Rocket System (MLRS)
66.	Armoured Recovery Vehicle (ARV) for MBT Arjun
67.	Portable Helipad
68.	Land Based Tactical Communication System
69.	Next Generation Fast Attack Craft
70.	Next Generation Fast Interceptor Craft
71.	Ship Based Vertical Launched Short Range Surface to Air Missile (VL SRSAM)
72.	Radar Warning Receiver (RWR) for Su-30 MKI
73.	Radar Warning Receiver (RWR) for Mi-17 & Mi-17 IV
74.	Instrumented Electronic Warfare Range (IEWR)
75.	Range extension Kit (REK) for 450 Kg High Speed (HS) Bomb
76.	Anti-Radiation Missile (ARMs) upto 100 Km

Anti-Radiation Missiles, Loitering Munitions. Their details are available on the MoD website.

Addressing the audience on the occasion, the Raksha Mantri described the third list as a symbol of 360-degree efforts being made by the Government to achieve Prime Minister Narendra Modi's vision of 'Aatmanirbhar Bharat'. He exuded confidence that this new list will prove to be crucial in the development of the domestic industry and take research and development and manufacturing capacity of the country to a higher level.

This third positive indigenisation list has been prepared after in-depth consultations with all stakeholders, such as Defence Research & Development Organisation (DRDO), Department of Defence Production (DDP), Service Headquarters (SHQs) and the private industry. Mr. Rajnath Singh assured that, similar to the previous two lists, the time limit given in the third list will also be adhered to. He said, Ministry of Defence and the Service headquarters will take all necessary steps, including handholding of the industry, reiterating the Government's endeavour to create an ecosystem that ensures self-reliance in defence manufacturing and encourages exports.

The DRDO, too, pitched in to strengthen local manufacturing by signing 30 Transfer of Technology (ToT) agreements with 25 industries. Raksha Mantri handed over the agreements pertaining to 21 technologies developed by 16 DRDO laboratories spread across the country. These technologies concern Quantum Random Number Generator (QRNG), developed by a DRDO Young Scientist Lab (DYSL-QT, Pune), Counter Drone System, Laser Directed Energy Weapon System, Missile Warhead, High Explosive Materials, High Grade Steel, Specialised Materials, Propellants, Surveillance & Reconnaissance, Radar Warning Receivers, CBRN UGVs, Mine Barriers, Fire Fighting Suits, Boots for Anti Mine, etc. So far, DRDO has entered into more than 1,430 ToT agreements with Indian industries, out of which, a record number of around 450 ToT agreements have been signed in last two years.

Congratulating DRDO and the Industry, the Defence Minister said, the handing over of 30 ToT agreements to the Industry "shows the increasing trust of Indian industries in DRDO-developed

Third Positive Indigenisation List

Sl No.	Description
With Effect from Dec 2026	
77. ▶	Digital Instant Fire Detection Suppression System (DIFDSS) for Infantry Combat Vehicles
78. ▶	155mm Ammunition with Course Correctible Fuse
79. ▶	Battle Field Surveillance Radar (Range 30 KM)
80. ▶	Operational Control System for AD Weapon for Army (AKASHTEER)
81. ▶	Fuel Cell Based Auxiliary Power Unit for BMP-2/2K
82. ▶	Integrated Stand for Instrument System
83. ▶	High Endurance Autonomous Underwater Vehicle
84. ▶	Mine Counter Measure (Autonomous Surface Vessel)
85. ▶	Buoyancy Glider for Enhancing Underwater Domain Awareness
86. ▶	Marine Sewage Treatment Plant
87. ▶	Supersonic Weapon Imitating Flying Target
88. ▶	Range extension Kit (REK) for 1000 Kg High Speed (HS) Bomb
89. ▶	Medium Altitude Long Endurance Unmanned Aerial Vehicles (MALE-UAV)
90. ▶	Launcher for Next Generation Anti Radiation Missile (NGARM)
91. ▶	Twin Store Rack for Smart Anti Airfield Weapon (SAAW)
92. ▶	Infrared Search & Track (IRST) for Su-30
93. ▶	Long Range Beyond Visual Range Missile (LR BVR) upto 250 Km
94. ▶	Long Range Guided Bomb 500 Kg
95. ▶	Long Range Guided Bomb 1000 Kg
96. ▶	Launcher for ASTRA Air to Air Missile
97. ▶	Quad Store Carrier for Fighter Aircraft
with Effect from Dec 2027	
98. ▶	LUNA (Optical Landing System-Aircraft Carrier)
99. ▶	Aircraft Launched Naval Anti-Ship Missiles-Medium Range
100. ▶	Medium Range Anti-Ship Missile (Ship Launched)
101. ▶	Submarine Launched Cruise Missile (Anti-Ship)

indigenous technologies. This will further strengthen the manufacturing eco-system in defence systems and platforms", expressing hope that the private sector will make full use of the opportunities being given to them by the Government in order to make India a global defence manufacturing hub.

Listing out the measures taken by the Government to maximise the participation of the domestic industry, the Raksha Mantri said, 68 per cent of capital procurement budget has been earmarked for domestic procurement to promote self-reliance and reduce import dependency. The other measures include earmarking of 25 per cent of defence R&D budget for the industry, start-ups and academia and corporatisation of Ordnance Factory Board.

The Minister pointed out that despite hurdles, India had always performed exceptionally well, on its own, in areas such as nuclear technology and space technology, due to the grit and determination of its scientists and researchers. With the same resolve, India will soon transform into a global manufacturing hub that caters to the domestic requirements, besides being a dominant force in international market, he added. He described the three lists as a self-imposed vow which can pave the way for a strong and self-reliant 'New India'. He underscored the importance of self-reliance in defence production and promotion in exports, terming it as a crucial aspect which strengthens the economy as well as national security, besides improving the socio-economic condition of the country.

The Raksha Mantri called for indigenous development of defence equipment and platform technologies, stressing that the import of systems, with foreign software codes, can prove to be dangerous for the security apparatus as it opens the window of vulnerability. Emphasising on the need to focus more on indigenisation, he stated, "Today, the scope of defence is not limited to borders only. Anyone can now break into the security system of a country with the help of different communication methods. No matter how strong the system is, if it is linked to another country, there is a possibility of a security breach. Earlier, the defense equipment, such as tanks and helicopters, were mainly mechanical in nature. It was not possible to control them. But, newer defence systems and platforms are electronic and software intensive. They can be controlled or subverted from anywhere."

Stressing on domestic production of ammunition as it ensures uninterrupted supply during wars, Mr. Rajnath Singh appreciated the fact that full attention had been paid to the import substitution of ammunition in the first two positive indigenisation lists. He said, when orders for defence items are given to domestic defense industry, it provides employment to lakhs of people working in MSMEs connected to the sector, spread across the country.

Mr. Rajnath Singh maintained that self-reliance does not mean to work in isolation from the rest of the world, but to work with their active participation within the country. "Even under 'Aatmanirbhar Bharat Abhiyan', we have provisions which provide suitable opportunities and environment to foreign companies to invest, collaborate, set up joint ventures and earn profit," he said. The Raksha Mantri reaffirmed the Government's constant endeavor to create an environment where public, private sector and foreign entities can work together and help India to become one of the world's leading countries in defence manufacturing.

Raksha Rajya Mantri Ajay Bhatt, Defence Secretary Dr Ajay Kumar, Chief of the Air Staff Air Chief Marshal VR Chaudhari, Chief of the Naval Staff Admiral R Hari Kumar, Vice Chief of the Army Staff Lt Gen Manoj Pande, Secretary Department of Defence R&D and Chairman DRDO Dr G Satheesh Reddy, other senior civil and military officials of MoD and representatives of the industry were present on the occasion.

HE-MRO: HAL and Safran sign strategic MoU

The ground-breaking ceremony for a new facility of Helicopter Engines MRO Pvt Limited (HE-MRO), a Joint Venture of HAL and Safran was held on 14 March 2022 at Sattari, 40 km from Panaji in Goa. Mr. R. Madhavan, CMD, HAL, Mr. Franck Saudo, CEO, Safran Helicopter Engines and senior officers from the Indian Armed Forces and HAL were present on the occasion. During the ceremony, both partners signed a "Memorandum of Understanding" to extend their cooperation and explore opportunities for new helicopter engines in civil and military markets, reflecting their commitment to the Indian Government's vision of "Atmanirbhar Bharat" towards achieving self-reliance in defence technologies and MRO.

Mr. Florent Chauvancy, EVP, OEM Sales & Marketing, Safran Helicopter Engines and Mr. Amitabh Bhatt, CEO, HAL's Bangalore Complex signed the MoU.

"The 1,000 sqm training and office facility and a 3,800 sqm international class shop facility will provide Maintenance, Repair and Overhaul (MRO) services for Safran TM333 and HAL Shakti engines installed on HAL-built helicopters to increase the operational readiness of the Indian Armed Forces", stated Mr. Madhavan.

Mr. Franck Saudo commented, "I am very proud to celebrate the launch of this world class MRO Centre for the TM333 and Shakti gas turbines aboard India Armed Forces helicopters. This complex will be a key factor for building customer satisfaction and supporting the Government of India's vision for aerospace MRO in India. With

a fleet of over 1000 engines, including 250 TM333 and over 500 Shakti, India's Armed Forces are one of the largest operators of Safran-designed helicopter engines and our company powers 100% of HAL produced helicopters. We support all HAL helicopter programmes and will offer the level of commitment to their future projects".

The facility will be operational by the end of 2023 with a capacity to repair 50 engines a year and a full-capacity goal of 150 engines in the coming years. The JV will also bring employment opportunities to over 60 qualified engineers and technicians of the region. The employment number will increase with growing activities over the years. The facility has an expansion capacity for other programmes and could include civil or other engines in the future.

India's Armed Forces are among the largest operators of Safran-designed helicopter engines with a fleet having over 1,000 engines, including 250 TM333 and over 500 Shakti engines. Shakti is the Indian variant of the Safran Ardiden 1H1, co-developed with HAL. HAL has produced over 500 plus Shakti engines till date successfully.

Shakti is installed on HAL's ALH/ Dhruv variants including Rudra and has also been selected to power the HAL-designed Light Combat Helicopter (LCH). The Ardiden 1U variant powers the new Light Utility Helicopter (LUH), a three-ton single-engine aircraft. The engine was certified by DGCA (India) on 26 July 2021 for civil applications.

HE-MRO is a joint Venture company of HAL and Safran which will provide maintenance, repair and overhaul (MRO) services for Safran TM333 and HAL Shakti engines installed on HAL-built helicopters. The aim is to constantly improve serviceability and reduce cycle time to help the operational preparedness of Indian Armed Forces. An earlier planned construction of this project had to be postponed due to a major crisis impacting the international helicopter market, closely followed by the worldwide COVID-pandemic.

Despite these events, both companies have continued their partnership, based on a shared vision: the HE-MRO JV as a key factor for enhanced customer satisfaction and to support the government of India's vision on Aerospace MRO in India. Through this groundbreaking, both companies commit to a multi-year investment plan, with construction starting very soon. The restart of the technical infrastructure construction reiterates the commitment of both partners to the Indian Government's vision of "Atmanirbhar Bharat" towards achieving self-reliance in defence technologies and MRO.

Launching of Vagsheer

Sixth Kalvari-class submarine of Scorpene design

On 20 April 2022, Vagsheer was launched by the Defence Secretary of India, Dr. Ajay Kumar. Vagsheer is the last of the six P75 Scorpene submarines entirely built by the Indian shipyard Mazagon Dock Shipbuilders Limited (MDL) based on years of successful technology transfer and partnership with Naval Group. MDL teams will now have to complete the integration and setting to work of the equipment and machinery onboard before beginning the sea trials, including weapon and sensor trials. The launching of Vagsheer highlights the success of the indigenous submarine construction programme of the Government of India.

These submarines have been completely built by Mazagon Dock Shipbuilders Limited (MDL) through a transfer of technology from Naval Group, in line with Indian Government's "Make in India" policy. The series of six submarines is fitted with a number of equipment built in India by qualified and highly trained industrial micro, small and medium enterprises (MSMEs). MDL and Naval Group have developed a rich industrial ecosystem of more than 50 Indian companies and their future projects are not limited to submarines, thus contributing to industrial and technological sovereignty.

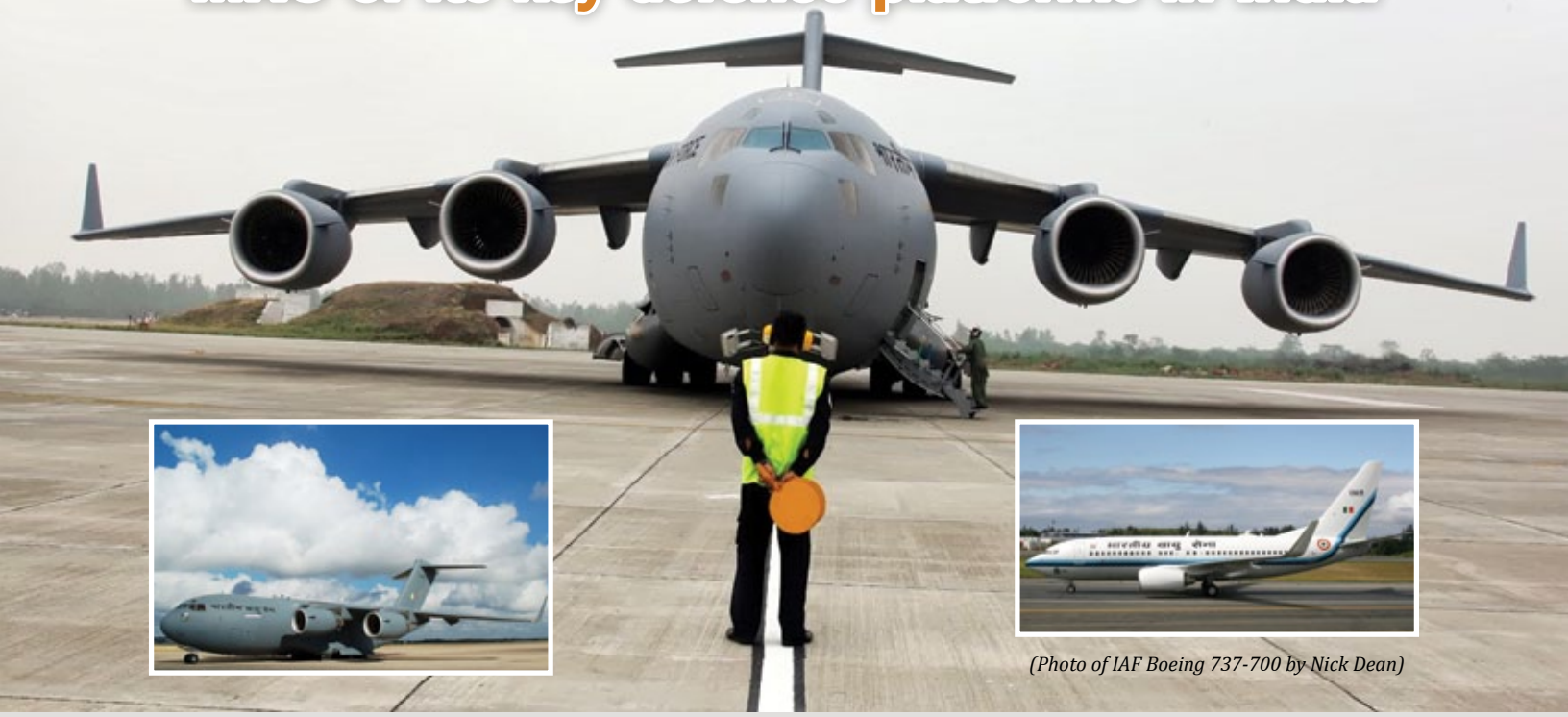
Alain Guillou, EVP International Development at Naval Group stated, "We are proud of this successful cooperation with MDL and we stand by their side and are ready to assist for future projects. We celebrate the success of "Make in India" while moving towards a true sense of "Atmanirbhar" naval defence industry. The success of this programme is collective and solely aimed at strengthening the Indian Navy. We value our long-term relation and collaboration with India and its navy and our teams are committed to keep on meeting their expectations."

The first of the Project-75 submarines was commissioned into the Navy in December 2017 and presently four submarines of this Project are in commission in the Indian Navy. The fifth submarine is progressing with the sea trials and is likely to be delivered this year. The sixth submarine will now commence setting to work of various equipment and their harbour trials. The crew will thereafter sail the submarine for the rigorous Sea Acceptance Trials after which the submarine would be delivered to the Indian Navy by late next year.

The Scorpene is a 2000 ton conventional submarine designed by Naval Group for all types of missions such as anti-surface warfare, anti-submarine warfare, long-range strikes, special operations or intelligence gathering. Extremely stealthy and fast, it has a level of operating automation that allows a limited number of crew, which reduces its operating costs significantly.

Its combat edge is highlighted by the fact that it has 6 weapon launching tubes, 18 weapons (torpedoes, missiles). With 14 submarines sold around the world, the Scorpene is a "key reference of conventional attack submarines (SSK) for navies around the world. It can be easily adapted to specific requirements of customers and the continuous improvement of the Scorpene ensures the seamless integration of the latest technology onboard".

Horizon Aerospace wins Boeing contract for MRO of its key defence platforms in India



(Photo of IAF Boeing 737-700 by Nick Dean)

Horizon Aerospace has won a contract with Boeing for the Maintenance, Repair and Overhaul (MRO) of three key Boeing defence platforms in India, the P-8I operated by the Indian Navy (IN), and the C-17 Globemaster and VIP 737 transport fleet operated by the Indian Air Force (IAF). This strategic collaboration aims to grow capabilities in India in the areas of wheels and brakes MRO of IAF and IN maintainers.

"The collaboration with Boeing strengthens and enriches our existing relationship. The enhanced collaboration underscores the growing international recognition for Horizon's capabilities in the aerospace and defence domain. We are proud to partner with Boeing and excited, to have been chosen to work with them on such prestigious and critical projects that build as well as test India's indigenous MRO capabilities," stated Per Smedegaard, Group President, Horizon Aerospace, Defsys Solution.

Horizon Aerospace (India) Pvt Ltd have been a part of the SAFRAN SPOT network, and a part of ECOSERVICES (Pratt & Whitney & ST Aerospace JV) networks. This co-operation will undoubtedly enhance Horizon offers and capabilities under Aatmanirbhar Bharat initiative of the Government of India. Boeing is one of the top aerospace companies for enabling implementation of best-in-class processes and operations in their supply chain. Horizon's collaboration with Boeing will enable Horizon to enhance its capabilities, on-time delivery and quality processes.

"This collaboration enriches our partnership with Horizon Aerospace, brings them aboard our Boeing India Repair Development and Sustainment (BIRDS) hub initiative, and is an important milestone as we continue to grow supplier-partner collaboration in India, for India. It will help us in our goal to generate value for our defence customers locally through faster turnaround, exceptional operational capability and readiness on Boeing aircraft", stated Ashwani Bhargava, Director, Supply Chain Management, Boeing India.

BIRDS hub is an in-country network and alliance of suppliers led by Boeing in India that envisions a competitive MRO ecosystem for engineering, maintenance, skilling, repair and sustainment services of defence and commercial aircraft. This network aims to drive high industry benchmarks in India for maintenance and repair, platform availability, customer satisfaction, quicker turnaround time.

Horizon Aerospace has been providing highly reliable and quality service, which helps in keeping aircrafts flying. The OEM supported service centre has over 700 assemblies serviced per month, and is one of the largest MRO service providers in India today. It is EASA, DGCA and CEMILAC certified and has a dedicated team of certified professionals to render accuracy in servicing. Horizon QMS is AS9110C certified and currently supports civil and military aircraft fleets. Horizon is approved on Safran Landing System and Collins Aerospace Global Network and processes over 600 wheels and brakes per month. Since inception in 2006 Horizon has delivered 59,000 plus units without failure. With a modern infrastructure and a pool of highly trained and experienced technicians Horizon is providing 'excellent and highly reliable service'. All trainings are carried out by OEM trainers (Safran and Collins Aerospace). Horizon is audited by the OEMs in addition to DGCA and EASA at regular intervals.

Boeing and Air Works accelerate MRO capabilities for IN P-8I's

Boeing and Air Works are currently undertaking heavy maintenance checks on three P-8I long-range maritime patrol and anti-submarine warfare aircraft operated by the Indian Navy (IN) simultaneously at Air Works, Hosur. This dramatically increases the scope and scale of Maintenance, Repair and Overhaul (MRO) undertaken in the country and demonstrates both the companies' commitment in helping make India Aatmanirbhar in aerospace and defence.

Surendra Ahuja, Managing Director, Boeing Defence India, stated, "We are proud to build on our existing collaboration with Air Works that enables us to generate significant value for our defence customers in India, and contribute towards the Government's vision of making India an MRO hub for the region. The ongoing satisfactory execution of heavy maintenance checks on three P-8I platforms concurrently by Air Works is a remarkable achievement."

Boeing's strategic collaboration with Air Works was an important first step under the Boeing India Repair Development and Sustainment (BIRDS) hub launched last year. The BIRDS hub envisions a collaboration with key local companies and businesses to develop India into an aviation and defence repair and sustainment hub.

"The heavy maintenance checks on Indian Navy's P-8I complement our vision of creating stronger and sustainable MRO capabilities, within the country. Maintaining such mission-critical platforms for the nation's defence forces is a matter of immense pride for Air Works. At the same time, it also reflects the "coming-of-age" or maturing of indigenous MRO capabilities in aviation, defence and aerospace, which can deliver huge advantages for the country. We thank Boeing for their trust in us and look forward to expanding our strategic partnership to eventually deliver operational excellence on other critical platforms of our defence forces to their complete satisfaction," stated D. Anand Bhaskar, Managing Director & CEO, Air Works Group.

The Boeing and Air Works collaboration has already been enabling faster turnarounds and enhanced operational capability within the country for the country's key defence platforms. The partnership began with the first P-8I aircraft Phase 32 checks, and has grown to include Phase 48 checks and MRO on the landing gear of the Indian Air Force's 737 VVIP aircraft.

Established in 1951, Air Works Group is India's biggest and highly diversified independent MRO with the largest pan-India network presence across 27 cities. It is the preferred MRO partner to global aviation OEMs, aircraft owners/operators (including fixed wing and rotary wing), lessors, airlines and the Indian Defence Services, offering a host of services including MRO and heavy checks, line maintenance, cabin and interior refurbishment, exterior finishing and painting, avionics upgrades, integrations and retrofits, end-of-lease/redelivery checks, maintenance training (CAR 147), and asset management services to domestic and international clients. Specialised set of services for avionics, component repairs and asset management services are offered via the Group's partner companies – SA Air Works and Acumen Aviation.

Air Works undertakes base maintenance for ATR 42/72, A320 and B737 fleet of aircraft from its EASA and DGCA-certified facilities at Mumbai, Delhi, Hosur and Kochi, supported by duly certified in-house shops for related tasks. The Company also undertakes modification and assembly of rotary-wing aircraft and is an Authorized Service Centre (ASC) for Bell and Leonardo helicopters.

Boeing's advanced aircraft and services focus plays an important role in mission-readiness for the Indian Air Force and Indian Navy. Boeing is "focused on delivering value to Indian customers with advanced technologies and remains committed to creating sustainable value in the Indian aerospace sector – developing local suppliers, and shaping academic and research collaborations with Indian institutions". Boeing has strengthened its supply chain with more than 275 local companies in India and a joint venture to manufacture fuselages for Apache helicopters. Annual sourcing from India stands at $1 billion. Boeing currently employs close to 4,000 people in India, and more than 7,000 people work with its supply chain partners.

Boeing and AIESL collaboration for MRO of key Indian defence platforms

Boeing 777 VVIP aircraft operated by the Indian Air Force (Image Credit: Andy Egloff)

Boeing on 10 May 2022 announced an effort to explore opportunities with AI Engineering Services Ltd. (AIESL) for the Maintenance, Repair and Overhaul (MRO) of critical equipment on key Boeing defence platforms in India, including the P-8I operated by the Indian Navy and the 777 VVIP aircraft operated by the Indian Air Force. The collaboration was announced at the Boeing India Aatmanirbharta in Defence conference organised at New Delhi with participation from dignitaries from the Indian Navy, AIESL, and other key supplier-partners.

"Our planned collaboration with AIESL could position us to provide significant value-add to our defence customers locally by enabling faster turnaround, exceptional operational capability and mission readiness for the Indian armed forces. This is also an important step as part of our commitment to the Government of India's Aatmanirbhar Bharat vision of making India a regional MRO hub," stated Surendra Ahuja, Managing Director, Boeing Defence India.

This collaboration would support the Indian Navy's growing P-8I fleet, building up the local aviation ecosystem, while ensuring quicker turnarounds for the Indian Navy. It would also help build indigenous MRO capabilities as it would bring the P-8I landing gear repair and overhaul work to India for the first time.

"Such collaboration would drive forward our vision for strengthening MRO capabilities in India, for India. We remain excited and committed as we provide critical support to India's armed forces as part of the Boeing India Repair Development and Sustainment (BIRDS) hub initiative," stated Sharad Agrawal, CEO, AI Engineering Services Ltd.

(L to R): Rajiv Kumar, Head of Marketing, DGM, AI Engineering Services Ltd, RAdm Deepak Bansal, VSM, ACNS (Air Materiel), Indian Navy, Sharad Agarwal, CEO, AI Engineering Services Ltd, Salil Gupte, President, Boeing India, Ashwani Bhargava, Senior Director, Supply Chain, Boeing India, Surendra Ahuja, Managing Director, Boeing Defence India, Faizi Mohsini, Director, Services, Boeing Defence India

Boeing India's collaboration with AIESL would provide further impetus to the BIRDS hub initiative, an in-country network and alliance of suppliers led by Boeing in India that envisions a competitive MRO ecosystem for engineering, maintenance, skilling, repair and sustainment services of defence and commercial aircraft. The hub has been growing capabilities in India in the areas of heavy maintenance, component repairs, training and skilling of MRO maintainers.

An important aspect of BIRDS is training programmes to increase skilled manpower by developing sub-tier suppliers and medium, small and micro enterprises (MSMEs) to build high quality MRO capabilities in India.

AI Engineering Services Ltd. is a Directorate General of Civil Aviation (DGCA) approved MRO set up in India that serves as a one-stop-shop for all engineering requirements at major airports with a pan-India footprint. Prior to Air India divestment, the company was transferred to a Special Purpose Vehicle (SPV), AI Assets Holdings Ltd., formed by the Government of India.

With a great skill set, huge professional experience and MRO infrastructure located at all the major metros, AIESL manages and maintains Airbus, Boeing and ATRs fleets belonging to various national as well as international airlines with Technical Dispatch Reliability of more than 99%.

AIESL facilities includes hangar facility, line and base maintenance, engine overhaul, avionics accessories shops and components shops, structural repairs including composite repair, cabin and seat repair facility, landing gear, engineering support service and many specialised services. Its dedicated support team for AOG requests provides highly coordinated troubleshooting and engineering support round the clock.

Exercises and visits

Indo-Uzbekistan "Ex Dustlik"

The 3rd edition of Indo-Uzbekistan Joint Field Training Exercise "Ex Dustlik" concluded at Yangiarik, Uzbekistan on 29 March 2022. The joint exercise provided an opportunity for both the contingents to train in counter terrorism operations in a semi-urban environment. The last two days of the exercise was dedicated to a validation exercise where both contingents jointly conducted simulated operations over 'extremist groups' under a United Nations Mandate.

The conduct of this exercise, which covered a vast spectrum from cross training and combat conditioning in field conditions, to sports and cultural exchanges was a grand success. The exercise will "enhance the level of defence cooperation between both the Armies and will act as a catalyst for many such joint programmes in future to further consolidate the traditional bond of friendship between India and Uzbekistan".

Seychelles and Lamitiye 2022

The 9th Joint Military Exercise Lamitiye-2022 between the Indian Army and Seychelles Defence Forces (SDF) was conducted at Seychelles Defence Academy (SDA), Seychelles from 22-31 March 2022. An Infantry Platoon strength each from both the Indian Army and Seychelles Defence Forces (SDF) along with Company Headquarters participated in this exercise

which was aimed at sharing experiences gained during various operations against hostile forces in semi-urban environment and enhance capability to undertake joint operations.

The Indian Army contingent comprising troops from the 2/3 Gorkha Rifles group (Pirkanthi Battalion) arrived at Seychelles on 21 March 2022.

Exercise Lamitiye-2022 is a biennial training event which has been conducted in Seychelles since 2001. Notably, in the series of military training exercises undertaken by India with various countries, Exercise Lamitiye with Seychelles is crucial and significant in terms of security challenges faced by both the Nations in the backdrop of current global situation and growing security concerns in the Indian Ocean Region.

The 10 days long joint exercise included field training exercises, combat discussions, lectures, demonstrations and culminated with a two days validation exercise. The objective of the joint training exercise was to build and promote bilateral military relations in addition to exchanging skills,

experiences and good practices between both the armies. Both sides jointly train, plan and execute a series of well-developed tactical drills for neutralistion of likely threats that may be encountered in semi urban environment, while exploiting and showcasing new generation equipment and technology for conducting joint operations. Due emphasis was laid on enhancing tactical skills in combating hostile forces in semi-urban environment and on increasing interoperability between forces.

The joint military exercise will "enhance the level of defence co-operation between Indian Army and Seychelles Defence Forces (SDF) and will further manifest in enhancing the bilateral relations between the two countries".

UAE army delegation in India

A delegation of United Arab Emirates (UAE) Army was on a six day visit to India from 21 to 26 March 2022. The delegation visited Indian Army training establishments and then attended the Inaugural Army to Army Staff Talks (AAST). The aim of the visit was to enhance defence cooperation engagements between the two armies.

The UAE Army delegation visited Army establishments in Maharashtra and included School of Artillery, Armoured Corps Centre & School, Mechanised Infantry Centre & School, National Defence Academy, Command Hospital of Southern Command, Army Institute of Physical Training, Military Intelligence School & Depot and Bombay Engineers Group & Centre. The delegation also visited Larsen & Toubro Limited and Tata Motors Limited at Pune.

Offshore security Exercise Prasthan

An offshore security exercise, 'Prasthan' was conducted in the Offshore Development Area (ODA) off Mumbai on 23 March 2022 under the aegis of Headquarters, Western Naval Command. Conducted every six months, this exercise is an important element of ensuring offshore security and aims to integrate efforts of all maritime stakeholders involved in offshore defence. Led by the Navy, the exercise saw participation from the Indian Air Force, Coast Guard, ONGC, Mumbai Port Trust, Jawahar Lal Nehru Port Trust, Customs, state fisheries department, Mercantile Marine Department and the Marine Police. The day-long exercise resulted in refining standard operating procedures (SOPs) and response-actions to a number of contingencies in the Offshore Defence Area off Mumbai.

The exercise was conducted on the B-193 platform of ONGC located about 38 nm west of Mumbai. Contingencies such as terrorist intrusion, bomb explosion, casualty evacuation, search and rescue, man overboard, major fire, oil spill and mass evacuation were exercised. Earlier, on 17 March 2022, loss of control of an OSV that necessitated towing by an Emergency Towing Vessel was also exercised. The exercise provided all stakeholders a realistic experience to assess their readiness to respond and combat contingencies in the Western ODA, as also to operate together in a coordinated and synergised manner.

IA exercise at Pokhran

The Indian Army conducted an airborne exercise at Pokaran on 1 April 2022 to validate its Rapid Response capabilities along the Western Front. The Exercise included combat free fall jumps with Guided Precision Aerial Delivery System GPADS and battle drills in a simulated hostile mechanised environment.

India–Kyrgyzstan Special Forces exercise concludes

The 9th Edition of the India–Kyrgyzstan Joint Special Forces Exercise which commenced on 25 March 2022 at Special Forces Training School, Bakloh (HP) culminated on 6 April 2022.

Over the two weeks, Special Forces contingents from India and Kyrgyzstan shared their expertise and best practices of tactics, techniques and procedures to counter existing and emergent threats across the entire spectrum of conflict. Combat shooting, sniping, survival in mountains, hostage rescue drills and unarmed combat were practiced extensively. Besides sharing special skills and techniques between participating Special Forces contingents, the joint training further "strengthened the existing bond between India and Kyrgyzstan that has fostered over years of mutual respect for strategic autonomy, democratic values and zero tolerance for terrorism".

India-Australia coordinated operations

On 12 April 2022, a P8I Maritime Patrol and Reconnaissance Aircraft of the Indian Navy arrived at Darwin, Australia. The aircraft and its crew undertook an operational turnaround at Darwin. During its stay, the team from the Indian Navy's maritime patrol squadron, Albatross, engaged with its counterparts from the 92 Wing of the Royal Australian Air Force. P8's from both countries conducted coordinated operations in Anti-Submarine Warfare and surface surveillance to enhance maritime domain awareness.

In recent times, increased interaction between the two maritime nations, through bilateral and multilateral exercises at sea, has enhanced inter-operability and fostered bridges of friendship. The P8 aircraft, with their demonstrated long reach, have operated jointly during Malabar and AUSINDEX series of exercises, and have a common understanding of operating procedures and information sharing.

The maritime waters between Indonesia and Northern Australia is an area of mutual interest to both countries, being a gateway into the Indian Ocean Region. Both India and Australia share strategic interests, "promoting a free and open Indo-Pacific and rules based order in the region".

Exercise Aagneyaastra

Spearhead Gunners of the Indian Army conducted the integrated firepower Exercise Aagneyaastra on 20 April 2022 to successfully demonstrate "highest standards of training, jointness and professionalism".

IONS Maritime Exercise 2022 (IMEX 22)

The maiden edition of Indian Ocean Naval Symposium (IONS) Maritime Exercise 2022 (IMEX-22) was conducted at Goa and in Arabian Sea from 26–30 March 2022. The aim of the exercise was to enhance interoperability in Humanitarian Assistance and Disaster Relief (HADR) operations among member navies. The exercise witnessed participation of 16 out of the 25 member nations of IONS.

The Indian Ocean Naval Symposium (IONS), established in 2007, is a premier forum for cooperation and collaboration among navies of littoral states of the Indian Ocean Region. The forum has enabled discussions on regional maritime issues, promoted friendly relationships, and significantly improved maritime security cooperation in the Indian Ocean Region. IMEX–22 comprised a Harbour Phase at Marmugao port, Goa from 26 to 27 March 22 followed by a Sea Phase in the Arabian Sea from 28 to 30 March 22.

The participation included warships, maritime reconnaissance aircraft and helicopters from the Navies of Bangladesh, France, India and Iran. 22 Observers from 15 IONS member navies, namely Australia, Bangladesh, France, India, Indonesia, Maldives, Mauritius, Mozambique, Oman, Qatar, Singapore, Sri Lanka, Thailand, UAE and UK also participated in the exercise. The participants validated the IONS HADR guidelines and developed response mechanisms for providing HADR from sea to shore as well as for rendering assistance to ships and crafts in distress at sea.

The Chiefs of Indian and French Navies witnessed exercises during the sea phase of IMEX–22 and also attended the post exercise debrief. The exercise is seen as a significant stepping stone for regional navies to collaborate and respond collectively to natural disasters in the region and paves way for further strengthening regional cooperation.

20th edition of Exercise Varuna 2022 concludes

The culmination of the 20th edition of the Indo-French bilateral naval exercise 'Varuna-2022' took place on 3 April 2022. The exercise this year had an expanded scope cover a broad spectrum of maritime operations. The eventful tactical sea phase of the exercise laid primary focus

on advanced anti-submarine warfare tactics, gunnery shoots, seamanship evolutions, tactical manoeuvres and extensive air operations. The units also undertook cross deck landings by integral helicopters, showcasing a high level of interoperability between them. Gun firing and underway replenishment procedures were also exercised between ships.

The final phase of the exercise progressed with tapered focus on advanced anti-submarine warfare (ASW) exercises. INS Chennai with Sea King Mk 42B, maritime patrol aircraft P8I, French Navy frigate FS Courbet, support vessel FS Loire, and other units exercised on full spectrum of ASW operations. The later part of the exercise also included exchange of sea-riders at sea.

The last day of the exercise had cross visits of personnel, cross embarkation of sea-riders and a closing session was conducted. Participants and operations teams of participating units met onboard INS Chennai for a comprehensive debrief. All evolutions conducted at sea were discussed with options for possible inclusions in the future editions of the exercise. After debrief, culmination of the exercise was marked by the traditional steam past between ships of both navies. INS Chennai passed the column of French warships at close range with personnel biding each other favourable

winds and following seas for the journey ahead.

Seamless coordination, precise execution of manoeuvres, and clockwork execution of complex anti-submarine warfare exercises characterised the conduct of Varuna-2022. All operational objectives of the exercise were accomplished by the participants in full measure. The exercise reflected high synergy and mutual understanding between the Indian Navy and French Navy that will bolster their ability to undertake joint operations in maritime theatre, when required. Varuna-2022 will go a long way in strengthening the strategic partnership between India and France.

Commissioning Ceremony of INAS 316

Indian Naval Air Squadron 316, Indian Navy's second P-8I aircraft squadron was commissioned into the Indian Navy on 29 March 2022. Adm R Hari Kumar, the Chief of the Naval Staff was the Chief Guest for the event. Addressing the gathering, Adm R Hari Kumar stated that "India is the 'Preferred Security Partner' in the Indian Ocean region which reflects our country's ability to play an effective strategic role in the region, and need to expand its operational reach. The Indian Navy is integral to this commitment and in pursuance of this objective, commissioning of INAS 316 marked yet another milestone towards enhancing maritime security and surveillance in the Indian Ocean Region".

INAS 316 has been christened 'Condors' which are one of the largest flying land birds with a massive wingspan. The insignia of the squadron depicts a 'Condor' searching over the vast blue expanse of the sea. 'Condors' are known for excellent sensory capabilities, powerful and sharp talons and large massive wings symbolising the capabilities of the aircraft and envisaged roles of the squadron.

INAS 316 will operate the Boeing P-8I aircraft, a multi-role Long Range Maritime Reconnaissance Anti-Submarine Warfare (LRMR ASW) aircraft, that can be equipped with a range of air-to-ship missiles and torpedoes. The 'Game Changer' aircraft is a potent platform for maritime surveillance and strike, electronic warfare missions, search and rescue, providing targeting data to weapon platforms, providing time-critical surveillance information for IA and IAF and is also the platform of choice for detecting and neutralising

enemy ships and submarines in Indian Ocean Region. The squadron has been specifically commissioned to be the home for the four new P-8I aircraft procured under the Option Clause contract and to '*Deter, Detect and Destroy*' any threat in the IOR. These aircraft have been operating from Hansa since 30 December 2021 and the squadron is integrated with full spectrum surface and subsurface naval operations.

INAS 316 is commanded by Commander Amit Mohapatra, an accomplished Boeing P-8I pilot with extensive operational experience. He has also flown maritime air platforms such as Il-38 and Dornier 228 and also Commanded INS Baratang as well as served as the Executive Officer of INS Tarkash.

INAS 316 Commissioning Ceremony

Group photograph of CNS with crew

Fly Past!

CNS & CO Desig INAS 316 Cdr Amit Mohapatra

Training of first batch of Indian Navy aircrew on MH-60R's

The Indian Navy's first batch of MH 60R 'Romeo' aircrew successfully completed their training at Naval Air Station, North Island, San Diego, USA on 1 April 2022. The 10-month long course included conversion training and other advanced qualifications on the MH-60R helicopter. The crew flew extensively from Helicopter Maritime Strike Squadron–41 (HSM 41) and achieved day and night deck landing qualification onboard a US Navy destroyer.

The crew would be responsible for inducting the versatile 'Romeo' into Indian Navy. The MH-60R helicopters will provide the Indian Navy enhanced offensive role including Anti-submarine Warfare, Anti-ship Strike, specialised maritime operations as well as Search and Rescue operations. 24 MH-60R helicopters were procured under a Government-to-Government FMS deal.

India's Defence Manufacturing - A journey of self-dependence and indigenisation

(Photo: Angad Singh)

India has shown an exemplary growth in defence manufacturing and exporting during the last decade. Most of this consistent and superlative growth is the result of increasing awareness and support with self-dependence and indigenisation in defence manufacturing, directed through the policies of 'Make in India', 'Make for the world' and 'Atma Nirbhar Bharat'. As a result, the defence export curve has moved upwards with more than 75% increase in the overall defence export since 2014-15.

The constant emphasis and encouragement to the inland defence manufacturing and harnessing the potential of the domestic research and development, technological advancements and industry-wide skill set has helped the Indian defence sector reach new heights with the passing years. Since 2014 Indian government has dedicated their focus on streamlining the defence manufacturing and creating an environment for ease of export with drastic policy reforms and easy processing, NOC and other regulations for export. The Standard Operating Procedure (SOP), incentives and benefits on Tax and Duties, Special cell for helping in the promotion of the defence exports etc. helped the public and private companies to concentrate on the exports and grew further.

India has never been a forerunner in the defence exports earlier. Stringent government policies, absence of focused

approach, less participation from private entities were the key factors. Even in the year 2001 India stood at as low as 40th position in defence export (total value) among the 86 other defence exporters worldwide, as per the Stockholm International Peace Research Institute (SIPRI) report. However, today, India currently stands 3rd in overall military expenditure followed by US and China and ranks among the top twenty defence exporters globally. This is not only a great progress but it also emphasises on the point that the Indian defence technologies and products are being accepted globally and the demand is soaring.

A March 2021 report by SIPRI pointed out that India's arms imports faced a remarkable dip during 2011-2015 and 2016-2020, as the government has been trying to reduce the import dependence in defence platforms and weapons. The decrease also hinted at India's intention to reduce dependence on leading defence country such as Russia and the complex procurement procedure. To further decrease the imports, the Indian defence ministry also announced the imposition of a phase-wise ban on the import of 101 military weapons systems and platforms in order to promote the domestic defence industry.

India has witnessed solid growth of 700% in defence exports from Rs 1521 crores in 2016-17 to Rs 10,745 crores in 2018-19 by serving 42 nations worldwide. The Indian government is continuously making efforts to sustain this growth. The Defence Production and Export Promotion Policy 2020 is an example of one such initiative that acts as an overarching guiding document to provide a focused, structured and significant thrust to defence production capabilities of the country for self-reliance and exports. Through the implementation of this policy and other initiatives in favour of defence manufacturing and exports, India aims to achieve a turnover of Rs 1,75,000 crores, including export of Rs 35,000 crores, in aerospace and defence goods and services by 2025.

Additionally, the role of MSMEs is highly imperative in defence segment. MSMEs who manufacture subsystems, components, electronics and other auxiliary products and solutions stand as a backbone for the defence segment, thereby giving sustainable manufacturing pace for exports too. The nimbleness and focused approach on building MSMEs will bring a lot of opportunities in terms of multi-technology requirements from an OEM perspective. Component sales in addition to platform sales helps in increasing exports of the country, gives birth to value adding products and technology, cost optimisation and increases the ability to respond quickly to the demand. MSMEs are gearing up with upgraded technologies like the Artificial Intelligence, IoT, Big Data, 3D Printing, Virtual Reality, automation with Industry 4.0, dedicated R&D, manufacturing scale up and skill developments to stay ahead in the game.

Since the beginning of the last decade, the Indian government has been taking multiple steps to streamline the infrastructure and upgrade the policies and systems to enhance support for the SMEs/ MSMEs to involve and contribute towards the growth of defence technology and manufacturing in India, the need is more. For instance, if we see 50 percent of exports are driven through MSMEs by 2025, India can achieve 17,000 cr of revenue in exports alone. To reach this, the government need to intervene more. It is already said that India has a strong base of MSMEs totalling up to 16,000, operating in different segments. The government can look at making clusters of MSMEs and adopt 500 key export-oriented MSMEs, provide them with all the guidance and capabilities. By doing so, these 500 MSMEs alone will have can achieve the earmark of 17,000 cr exports revenue and transform as a global manufacturer from the country.

Secondly, there is a need for forum to address the nodal points faced by MSMEs and support them on how to function with the existing strength or build on new opportunities. The government can create nodal agencies to address the reach issue of local MSMEs by providing access to the global platforms. Though larger corporates like Boeing, Lockheed Martin, GE, IAI, Rafael are already scaling to collaborate with Indian companies, the robust infrastructure set up consolidated by process and system will aid MSMEs to be part of the global radar.

In a nutshell, overall defence exports help in strengthening diplomatic and economic partnerships and create ever growing opportunities for strategic partnerships. A sustained focus and support from the centre would keep up the momentum and India will soon become the one of the largest defence manufacturers in the world.

Finally, we should all remember that for the long-term interest of the country, this phase should be considered as the investment opportunity and not a profit-making phase. The companies should focus on a strategy to stay patient, persistent and purposeful to reap the benefits in the days ahead.

(Ref: https://www.ibef.org/industry/defence-manufacturing.aspx)

Article by Mr. Chandrashekhar HG, CMD, SASMOS HET Technologies Limited

Akbar Nama

Shwetabh Singh takes us through the story of Mi25/35 family with the Indian Air Force

Introduction

"On 26 October 1987, Flight Lieutenant Atanu Guru flew in a mission ex-Jaffna to search and destroy militants' vehicles operating on the Jaffna Karaitivu causeway. Five vans were located on the causeway while attempting to flee towards Karaitivu. With extraordinary accuracy and commendable professional calmness, he destroyed these vehicles and killed all the militant personnel aboard these vehicles." This was the first mentioned incident on Ft Lt Atanu Guru's Vir Chakra citation.

The Mi-25s of No 125 Helicopter Squadron were flown into Sri Lanka, under the command of Sqn Ldr Rajbir Singh, around 23 October 1987, in the aftermath of the disastrous Jaffna Helidrop Operation.

The first strike mission on 26 October was flown by Ft Lt Atanu Guru in a lone Mi-25. Five LTTE heavy transports carrying ammo and explosives were moving on the Jaffna Karaitivu causeway, the concentrated fire by Ft Lt Atanu Guru's Mi-25 resulted in the death of over 100 LTTE cadres and an explosion that could be heard 30 kms away. The gunships were particularly effective in their role, immediately restricting LTTE's

Chetak firing an AS11 ATGM. Photo: @bennedose

movement to only night-time. It is said that LTTE feared the Hinds of IAF the most, giving them the nickname Mudhalais ("alligator" in Tamil) (Subramaniam).

Indian Air Force wasn't new to the idea of offensive helicopters, as in 1960s Indian Air Force when it was first being equipped with Chetak Helicopters (SA316B), IAF received Chetaks equipped with the AS11 ATGMs (A2S version of SS11 ATGMs), with No 116 Helicopter Unit being one of the first ones to receive Chetaks in an offensive role, and getting the nickname 'Tank Busters'. The AS11 gave new capabilities to the Indian Armed forces, but early generation ATGMs still lacked in range, accuracy and efficiency, the need for a dedicated Attack helicopter with newer ATGMs arose (Sachdev). Thus enters the picture, Mil Mi-25s, Crocodiles procured amidst the biggest modernising drive of Indian Armed forces in 1980s.

The Crocodiles of the Indian Air Force are mysterious beings, with not a lot of literature to track their journey with the Indian Air Force. In this piece, I hope to track their history with the Indian Air Force to the best of my abilities.

History

a) Development of the Flying Tank

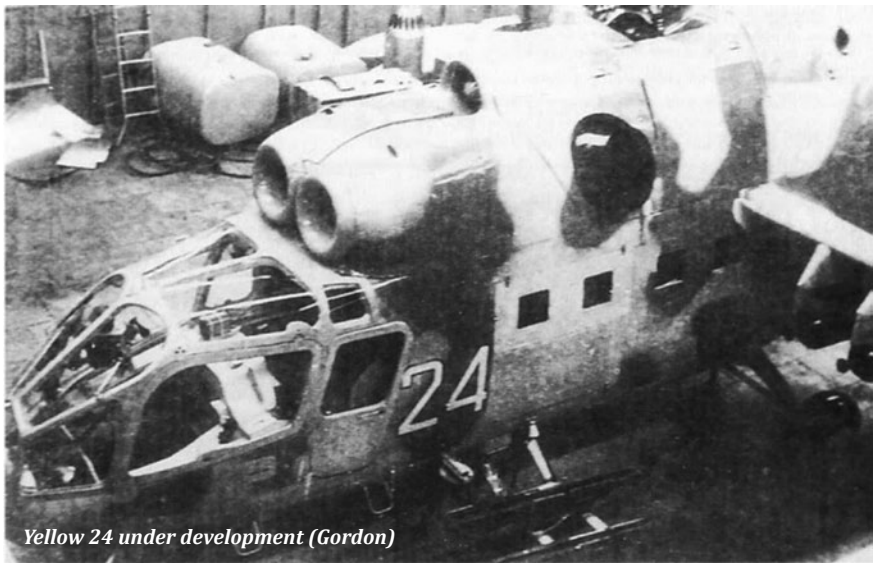
Although not the first one to use helicopters in an air assault role, the United States was definitely the one that shaped and matured the concept. The US was amidst a very intense war in Vietnam in the 1960s. As the transport helicopters kept getting shot while landing, modified Huey gunships were used. When they couldn't satisfactorily perform in the face of the emerging threat against infantry landing, the first AH-1 was developed.

In the eastern theatre, the USSR was also tip-toeing the same line. Initially arming Mi-8s with rocket pods in limited armed roles, but as they would also go on to realise the need for a dedicated attack helicopter, the first Mi-25 would be born. Mikhail L Mil, of which the Mil OKB bore the name, would pitch his 'flying IFV' concept to the Soviet leadership, having gained some experience with armed helicopters in the form of armed Mi-4s and 8s. Initially reluctant, with even then Defence Minister of the USSR, Rodion Yakovlevich Malinovsky, against the concept (Gordon).

In 1966, approximately 1 year after the first flight of what would become AH-1 Cobra, Mil OKB had released a mockup called V24 (V = Vertolyot = Heptr) based on the utility V22 design. It shared a lot of visual similarity with the armed UH-1, and was nicknamed 'Hueyski'. In 1967, Mil through a lot of effort convinced the Defence Minister's First deputy Marshal Andrey A Grechko, to establish a committee to study the concept. By March 1967, Military-Industrial Commission of the USSR, or VPK issued a RFP to Mil to design a battlefield support helicopter (Gordon).

After getting clearance in 1968, the OKB started work on a mockup called "Yellow 24", or the internal designation 'Izdeliye 240'. Mil OKB decided to speed things up by taking components like engines, main and tail rotors, swashplate, parts of the powertrain from Mi-14, which was itself developed from Mi-8 family. Thus the first true attack helicopter of the East started taking shape. The helicopters much like AH-1 would come out a lot different than its utility counterpart, with the OKB focusing on reducing drag and changing the fuselage, getting fully retractable landing gear etc. A lot of attention by the OKB was focused on survivability of the aircraft and crew protection, with bulletproof windscreens, armour plating, single pressurised cell for crew and troop cabin (Gordon).

Three Mi-35s in a flypast of Indian Air Force



Yellow 24 under development (Gordon)

Mil Mi 24A

The helicopter's development was completed well ahead of development of its weapons package, so during the initial testing the Izdeliye 240 was tested with K4V weapons systems, which had service with Mi-4V and Mi-8TVs, consisting of four 9M17M Falanga M ATGMs, which were a contemporary of the SS11 ATGMs. The nose gun was an Afanasev A-12.7 on a NUV-1 gimballed mount taken from a Mi-4V.

Flight tests of the type began in September of 1969, which included 2 initial prototypes and 10 from a pre-production batch. Testing went as expected, except for a hiccup in the form of a crash of a frame in front of higher command while showing the agility of the new type. The crew of pilot, test engineer and flight engineer were all killed. The State acceptance trials began in 1970, going on for the next year and a half. Testing resulted in lessons learnt and some major changes to the helicopter were made before production of Mil Mi-24A or Izdeliye 245 (Gordon).

While changes needed were observed on the Mil Mi-24A, the OKB would start working on a development of Mi-24B, with a new gun, sighting system and 9M17P Falanga P SACLOS ATGMs. Izdeliye 241 as was the internal designation would go on to complete the OKB's trials but would be abandoned and the development used for what would go on to the feared Flying Tank, in the form of the Mil Mi-24D and Mi-24V (Gordon).

Suffering from cockpit visibility issues in Mi-24A, which was in service with


Tail no. Z3137 Mi-24VU/Mi-35U of Indian Air Force. Notice the smooth chin

VVS, a new redesign of the frontal fuselage happened in 1971. The cockpit was now divided in two, separate ones for pilot and WSO (Gordon).

Amongst the other structural and electronic changes made to the type, one thing that was lacking was still the original weapon systems envisioned in the form of the 9K114 Shturm ATGMs. So the OKB decided to fit the weapons package developed for Mi-24B onto this new airfare and designated it Mi-24D. Two prototypes were converted to the type in 1972 from Mi-24A and state acceptance trials began soon in 1973 concluding in 1974. Mi-24D entered production at Plant No 168, Rostov Helicopter Factory (Gordon). It was Mi-24D's export version which was offered to the Indian Air Force in late 1970s and early 80s, and it would be this version only, designated Mi-25, which would be inducted in the Indian Air Force in 1984.

The next step in development came in the form of Mi-24V or Izdeliye 242, whose export version would be designated Mi-35, which would again be inducted with the Indian Air Force later (Gordon).

It was in 1972 finally that the weapons package planned for the Mi-24 family finally became available. The missile was designated 9K114 Kokon was being developed by Kolomna OKB which had and was working on a lot of missile systems for the USSR. The availability of 9K114, resulted in Mi-24V finally coming out. Trials of 9K114 were completed in 1974. The newer version differed from Mi-24D in having a newer uprated engine TV3-117V, a new ASP- 17V gunsight, new communication equipment amongst other things. Mi-24V would complete its acceptance trials in 1975, yet both Mi-24D and Mi-24V would be inducted in the VVS at the same time in 1976, although quite some Mi-24Ds had already been delivered till then, and Mi-24V started production in 1976 (Gordon).

A trainer version was made for Mi-24D in the form of Mi-24DU or Izdeliye 249, which would appear in 1980, quite some time after both Mi-24D and 24V had already been inducted. Visually it differed from the Mi-24D/Mi-25 in having a very smooth nose instead of the USPU 24 gun barbette. The trainer version of Mi-24V/Mi-35 however did not ever exist for the VVS, yet when Indian Air Force ordered Mi-24V/Mi-35, the order consisted of newer trainers as well. The trainer version seems to be custom built for the Indian Air Force, and were ordered in 1990 with 20 frames including the Mi-24VU/Mi-35U (a designation that doesn't exist per se) and Mi-35s were supplied (Gordon).

b) Akbar comes to India

The Mi-25's story with the Indian Air Force, technically begins in the late 1960s with the induction of armed Chetaks. But after that prelude was over, it was in the late 1970s, around 1979, that the Mi-25 was first offered to the Indian Air Force. Indians would take up on the offer, and the first evaluations of the type would go on to happen in 1981, and the type was promptly ordered in 1983 for 12 frames (Gordon)(Singh).

It was on 1 November 1983 that the first Mi-25 dedicated attack helicopter unit was raised with the Indian Air Force, No 125 Helicopter Squadron 'Gladiators', now boasted some of the most impressive firepower in the subcontinent, carrying loads somewhat equivalent to the fighter planes that the skies of the subcontinent saw approximately a decade ago. The first Mi-25 would then go on to land at Pathankot AFB, home of the No 125, in mid-1984 (Singh).

First Mil Mi-25 of No 125 Helicopter Squadron landing at Pathankot in mid-1984. Credit: AM P K Roy's personal collection

The first teams of technicians and pilots would go on to leave for the USSR for training in 1983. Much like their fighter brethren, they went to Frunze close to Logovaya, Kyrgyzstan SSR. Indian Air Force had been here before, as early as 1962, when the first batch of 8 pilots had left to convert on the legendary MiG-21F13s that Indian Air Force had then procured.

Another source claims that the Mi-25s were actually tested only after having already been inducted in the Indian Air Force and only 8 Mi-25s were ever ordered (Roy).

First the technical tradesmen along with 5 Technical officers went for training. Pilots - initial message to 10 officers to be on standby, they were received in April 1983. Thereafter they were attached to Air HQ for briefing and finally departed for the USSR in mid-September, around 15-16 September 1983. Training for both technical tradesmen and pilots at Frunze close to Lugovaya where the Mig-23 pilots were trained. Six months training for the technical tradesmen and three months of training was parted to the pilots. Three Indian Air Force training teams were simultaneously present in the USSR at the time, training for the upcoming inductions of An-32s, Il-76s and Mi-25s (Roy).

On the morning of 8 October 1984, Indian Air Force was celebrating the Air Force Day, and in New Delhi were displayed two of the most recent acquisitions of the Indian Air Force. An An-32 transport plane and two Mi-25s in yellow green drab that it became famous with. During the subsequent parade, then COAS ACM LM Katre remarked the Indian Air Force had entered "combat helicopter age".

Due to the absence of any attack helicopter experience and SOPs, in 1984-85 nine Mi-25 pilots were sent to TACDE (Tactics and Air Combat Development Establishment, Indian Air Force's version of Top Gun) for the first 'Attack Helicopter Course'. As even TACDE lacked any attack helicopter pilots, the instructors were pulled from the fighter pilot stream and through trial-and-error, working with the student pilots they developed the first SOPs for the Abkars and any other future attack helicopters (Roy).

No 125 was also pitched in one of the largest exercises ever conducted by the Indian Army, Operation Brasstacks in 1987, within 4 years of its inception. The Mil Mi-25s of the Indian Air Force were purchased in coordination with the Indian Army. While the ownership remained in the hands of Indian Air Force and Indian Air Force pilots flying the type, the helicopters were meant to serve the Indian Army and hence were under their operational command (Ganapathy).

c) Firebirds join the fray

As the Mi-25s of No 125 were in the heat of the field, honing their skills in actual combat, another batch of pilots were leaving India to train for the incoming Mi-35s.

As the Mi-25 was integrated with the Indian Army and Indian Air Force, the need for more attack helicopters was felt. Around 1987-88, it was announced that the Indian Air Force was looking for more attack helicopters and had already evaluated Augusta A129 Mangusta, MBB Bo 105 and Mi-28, and although the Indian Army prefers the Western offers, the Soviet offer might be chosen due to economic constraints (From Vayu Aerospace Review Issue V/1988). The Mi-28 had completed acceptance trials in 1984 and entered production in 1987 (Gordon).

It might be the case that it was actually the Mi-35 that was trialled by the Indian side, since there was initial media confusion on believing Mi-35 to be an export version of Mi-28, instead of Mi-24V.

The existence of the Mi-24V's export version, Mi-35 was apparently revealed to the Indian side around 1988 and an order for 20 Mi-35s (including trainers) was secured by the USSR during a visit of Soviet Defence Minister Marshal Dimitry Yazov in October of 1988 (40 Years of VAYU/from Vayu Aerospace Review Issue V/1988).

Another source claims that the order for Mi-35s came as a normal follow on after the experience of Mi-25s, and there was no competition held to acquire newer attack helicopters (Singh).

After the collapse of the USSR, the breakaway republics had Mi-35s in stock

No. 104 Heli Squadron after their first test firing exercise of the Shturm PGM at Pokhran in Feb 1990. Photo taken at Jaisalmer. Standing in center is Wg Cdr Unni Kartha. Photo credit: Bharat Rakshak

A pair of Hinds on patrol

that either were redundant to requirements or simply were not economically feasible. A few of them were pitched to India. Teams from the Indian Air Force did visit the ex-USSR states like Belarus to take note of the conditions of the Mi-35s and determine air-worthiness. Although they wouldn't be procured to operate with the Indian Air Force, IAF looked at them for spares. (Ganapathy).

In April of 1990, No 104 Helicopter Unit (then a unit, later converted to a helicopter squadron in 1992) was formally inducted with the newer Mi-35s. In June 1990, after the induction of the type with No 104, No 125 which was still operating the Mil Mi-25, was supplemented with the newer Mi-35s as well.

No 104 Helicopter squadron is the only active squadron in the Indian Air Force with the modernised Mil Mi-35s. No 125 squadron has been fully converted to AH-64E since 2019.

Major Ops

The flying tanks of the Indian Air Force saw combat pretty early on in their career, while the Indian Air Force and the Indian Army were still trying to figure out how the piece filled into the larger picture. India had lacked any dedicated attack helicopters till now, and SOPs needed to be developed at various levels before they were pitched to the field. Aside from the conflict on India proper, Mi-25s/35s have been pitched on a lot of major operations in the subcontinent and beyond.

a) IPKF

Mil Mi-25s were baptised with fire pretty soon after their induction. No 125 was already trying to develop joint mechanisms to work with ground based forces in a conventional field war setting with Operation Brasstacks, and they were called upon into combat in an unconventional guerilla type war with Operation Pawan in 1987. As already mentioned it was under Wg Cdr SC Malhan that the No 125 was deployed in Sri Lanka to participate in Jaffna operations, quickly after the Jaffna helidrop. Initially it is believed that six helicopters were deployed in operations, with the squadron rotating on stations later. The number of frames deployed very well depends on the number of Mi-25s inducted, 8 or 12, which show the level of confidence of the Indian Army and Indian Air Force in the type.

Their induction in the theatre of war provided much needed air support to the troops. Their roles throughout the war also changed from recon and suppressive fire to bombing, to armed escort to CAS.

Mudhalais in their search and strike role during the initial phase of the operations were particularly effective, limiting the movement of LTTE road and water transports to night time conditions. Later as the war converted to an insurgency, the utility of Akbar started waning (Pillarisetti).

Nevertheless within two and a half years, from October 1987 to March 1990 withdrawal, the No 125 Squadron earned two VrCs and two YSM for its contribution to Operation Pawan as the sole attack helicopter squadron (Pillarisetti).

No 125 in Sri Lanka. Photo: Bharat Rakshak

b) UN Ops

The Hinds of the Indian Air Force had a taste of foreign soil very early in their journey and would keep having it multiple times. Due to the close coordination with the Indian Army, they have been deployed at least twice in UN supported missions, once in Sierra Leone and later in Congo.

UNAMSIL was one of the largest peacekeeping deployments by the Indian armed forces with 3000 personnel in the mission. While initially deployed with Mi-8s and ground troops, by May 2000 it became clear that air support would be required. Promptly on 2 June 2000 three Mi-35s were loaded on An-124 and shipped to Sierra Leone (Peacekeeping in Sierra Leone).

They would go on to participate in the famous Operation Khukri to liberate the peacekeepers kept hostage by the RUF

Mi-8 being escorted by three Mi-35s in Sierra Leone

was when a rebel group named CNDP tried attacking Goma, where the unit was stationed, twice, once in 2006 and again in 2008. Both the times Mi-35s proved invaluable in repelling these attacks by determining exact locations of rebels and providing air support in form of rockets and concentrated machine gun fire. The sensors aboard the Mi-35s, like the FLIR also helped in targeting and relaying targeting locations to the ground troops for coordinating a response (Dorn).

The unit was nicknamed 'Vipers' while deployed in Congo. The unit also when deployed in the Goma region first in 2006, logged an astonishing 1000 flight hours within 10 months of their induction in the region. At least one Mi-35U/24VU was also stationed in the region, Tail no Z3129.

Two Mi-35s of No 104 in Congo. Photo: Bharat Rakshak.

rebels. The Mi-35s undertook armed action, providing accurate suppressive fire, which allowed troops to be inducted from Mi-8s, while Chetaks acted as mobile command posts directing both Mi-8s and Mi-35s (Peacekeeping in Sierra Leone).

Around 2004, Indian Armed Forces Contingent with the UN mission in Congo, MONUC was supplemented with 4 upgraded Mi-35s No 104 Firebirds for CAS and recon missions. They were based at Goma and proved immensely valuable in the region to peacekeeping forces.

They were deployed in various roles over the course of deployment from CAS, recon to escort duties. One of the highlights of the deployment of the Mi-35 in the region

Tail no Z3129/ UN-859 at Kinhasa

Entering the 21st century

Mi-25s and Mi-35s although very capable in their duties suffered from limitations. As Gp Cpt Pradeep Mulay mentioned that "It would've been an ideal aircraft if it had night vision". The Hinds of the Indian Air Force suffered from the lack of navigational aids and night vision. This need was noted and when the Hinds entered the 21st century, plans to modernise were put in place (Ganapathy).

In 1998, Indian Air Force signed a $US 20 million contract with IAI to further upgrade 25 of the newest frames of the total lot of Mi-25/35s with the Mission 24 upgrade package.

Mi-35 and AH-64E of Indian Air Force. Photo: Wg Cdr Indranil Nandi.

It was based on IAI Tamam's helicopter multi-mission optronic stabilised payload (HMOSP) and weighed around 30kgs. The upgrade package provides day/night observation capabilities and targeting through TV and FLIR sensors with variable FOV (between 2.4º and 29.2º on the FLIR) and in-built automatic tracking. Other changes included pilot NVGs with flight data and map projected on one eye piece, an integrated self-protection suite, and data handling systems. The navigation equipment got an upgrade by including a GPS system that works in parallel to the doppler navigation. The HMOSP and the chingun were slaved to the pilot's line of sight, and a new mission computer (Chauhan).

Post Balakot, the Indian Air Force wanted to equip its Mi-35s, now with No 104, with the latest ATGMs and hence ordered an undisclosed amount of 9M120 Ataka ATGMs. The contract was reportedly with Rs 200 Crore. 9M120 is a development of the original Shtrum ATGMs. The exact variant of Ataka ordered remains unknown.

Conclusion

Hinds have been in the subcontinent since the 80s, and have served the Indian Air Force for approximately 4 decades, although not the same air frames. With even the Mi-35s having served for three decades now. The space left by retiring Mi-25s was filled with the induction of a much more advanced type in the form of the AH-64E Apaches. The Indian Army and Indian Air Force have already inducted ALH-WSI Rudra in an attack helicopter capacity. The forces are already looking to induct another dedicated attack helicopter in form of the LCH, whose LSP models in both Indian Army and Indian Air Force livery have been spotted as the time of writing.

Mi-35 of Indian Air Force with Shtrum ATGMs

The first true combat helicopter of the Indian Air Force has had an amazing legacy of operations and roles, and is surely ageing a lot faster and would be replaced. The quagmire of control of such CAS assets still is a point of contention between the forces. The problem was initially tackled by having ownership by one arm and operational control by the other, but it seems both arms are diverging on the issue seeking to procure their own armed helicopters.

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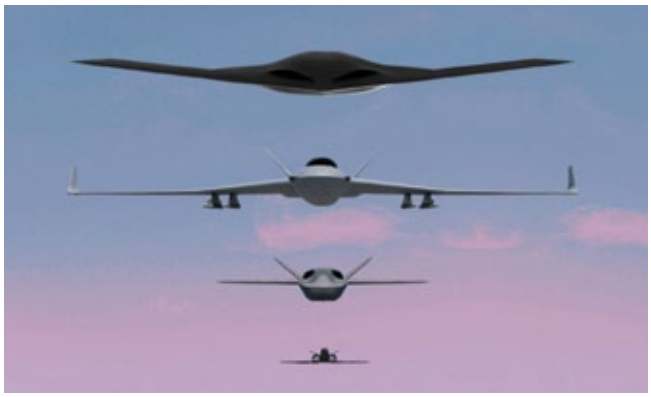
GA-ASI announces Evolution class of UAS



General Atomics Aeronautical Systems, Inc. (GA-ASI) announced its new category of future-forward unmanned aircraft systems, focused on information dominance and airspace supremacy. Leveraging three decades of experience across millions of successful combat flight hours, the new Evolution line of advanced UAS joins GA-ASI's existing Predator-class and Mojave-class aircraft in delivering next-generation UAS that lead the pack in advanced, affordable, attritable and autonomous combat power.

Third and fourth Typhoons land in Kuwait

The third and fourth Eurofighter Typhoons for the Air Force of Kuwait landed in country in the framework of a wider order for a total of 28 aircraft that will be delivered to the Kuwait Air Force. The ferry flight for the new Kuwaiti Eurofighters was made possible thanks to the Italian Air Force's essential support, which guaranteed the "Air to Air Refueling trail". This was achieved through a complex operational activity involving one KC-767A tanker from 14th Wing, Pratica di Mare.

HII delivers Virginia-class submarine Montana

HII, America's largest shipbuilder has delivered the newest Virginia-class fast-attack submarine to the US Navy. Montana (SSN 794), which successfully completed sea trials is the 10th Virginia-class submarine to be delivered by HII's Newport News Shipbuilding division and the 21st built as part of the teaming agreement with General Dynamics' Electric Boat.

NGC completes ferry flight of Japan's RQ-4B

Northrop Grumman successfully ferried the first of Japan's three RQ-4B Global Hawks via a non-stop transpacific flight. The aircraft departed on 10 March from Palmdale, California landing 18.7 hours later on 12 March at Misawa Air Base, Misawa, Japan.

Huneed Tech of Korea's CCAs for GA-ASI

General Atomics Aeronautical Systems has awarded Huneed Technologies a contract to manufacture and supply Circuit Card Assemblies (CCA) to for its unmanned aircraft.

Arajet orders 20 737 MAX jets

Boeing and Arajet announced that the new Caribbean airline has ordered 20 737 MAX airplanes, specifically the high-capacity 737-8-200 model, to deliver low operating costs and expand travel options in the Americas. Arajet also has options to purchase 15 additional 737 MAX jets which, along with existing lease agreements, could take the airline's new fleet to 40 airplanes.

Cessna SkyCourier earns FAA Type Certification

Textron Aviation announced that the Federal Aviation Administration has granted type certification for the new twin-engine, large-utility turboprop Cessna SkyCourier. Using a clean-sheet design and advanced manufacturing processes, the high-wing aircraft's production line is underway, and the first unit will soon enter the market with launch customer FedEx Express.

Hensoldt develops new solution for EW data fusion

Sensor solutions provider Hensoldt is putting its latest technologies in sensor data fusion and analysis at the service of increased protection for the Eurofighter. By combining its Spectrum Battle Management Suite (SBMS), which creates a situation picture from a huge amount of Electronic Warfare (EW) data, with an advanced version of the evaluation software of the Eurofighter self-protection system "Praetorian", the so-called Electronic Warfare Data Analyser (EWDA), Hensoldt has developed a tool that allows mission data of the Eurofighter to be evaluated much faster and more precisely and to be used for programming future missions.

Natilus announces milestones in autonomous freighter

Natilus, Inc., the US company working to 'democratise global freight transport by making air cargo more competitive', has announced major milestones in the design and development of its fleet of autonomous aircraft and an important new contract with Collins Aerospace to provide specialised cargo loading systems. Natilus is offering a family of autonomous cargo aircraft with greater efficiency and cost-savings by innovating the design of freight transport aircraft to increase cargo volume by 60%. This will lower the cost of freight operations by 60% and cut carbon emissions in half.

China acquires six AW189's for SAR

China's Rescue and Salvage Bureau of Ministry of Transport, PRC (MOT CRS) has signed a contract for six AW189 super-medium twin-engine helicopters, which will be utilised across the coastlines of China for maritime SAR operations. The fleet deliveries will be completed by 2023.

Navantia and Kongsberg MoU for F-310 frigates

Kongsberg Defence & Aerospace and Navantia have signed a Memorandum of Understanding with the objective of exploring potential mutual collaboration in support of and future modernisation of the Royal Norwegian Navy F-310 Nansen class frigates. The Nansen Class Frigates, delivered between 2006 and 2011, were designed and built by Navantia for the Norwegian Navy. Navantia has been supporting the Norwegian Navy since 2013 in the sustainment and maintenance of the frigates.

BAE Systems receives contract for ACR-V

BAE Systems has received a $34.9 million contract from the US Marine Corps for the design and development of an Amphibious Combat Vehicle Recovery (ACV-R) variant. The ACV-R will replace the legacy Assault Amphibious Vehicle recovery variant (AAVR7A1), and will provide direct field support, maintenance, and recovery to the ACV family of vehicles.

MBDA contracted by Greece for weaponry

MBDA has strengthened its close relationship with Greece's armed forces with two contracts for armaments for the Hellenic Navy and Hellenic Air Force. The first contract will supply the ASTER 30 B1 area air defence and MM40 Exocet Block 3C anti-ship missiles for three Defence and Intervention Frigates (FDI HN) – plus an optional additional frigate. The second contract will supply weaponry for six additional Rafale combat aircraft. This follows on from the contract signed in January 2021 for the weaponry for 18 Rafale aircraft. The additional six aircraft will be equipped with the same weapons package: the Meteor beyond visual range air-to-air missile, the SCALP cruise missile, the MICA multi-mission air-to-air missile, and the AM39 Exocet anti-ship missile.

Greece to acquire 3 Belh@rra frigates

Thales "welcomes Greece's decision to acquire the Belh@rra export variant of Naval Group's FDI defence and intervention frigate for the Hellenic Armed Forces". A firm order for three frigates with another one on option was signed by the Greek authorities. Thales will provide its Sea Fire radar, a fully solid-state multifunction radar with a fixed, four-panel antenna that simultaneously performs long-range air and surface surveillance as well as guidance for anti-air missiles. This is the first export success for the Sea Fire radar, which is designed to deliver 'outstanding' performance in high-intensity combat situations. The frigates will also be equipped with an IFF (Identification Friend or Foe) solution and fire control radar.

Damen selects Leonardo to equip German Navy's frigates

Leonardo's OTO 127/64 LightWeight (LW) Vulcano naval defence systems have been selected by Damen to equip German Navy's new four F126 frigates, with the addition of two optional vessels. In addition, the contract includes the supply of support for maintenance activities, simulators for crew training and on-board activities for the integration and commissioning of the system.

Indonesia gets first batch of Turkish Kaplan tanks

Turkey's FNSS has delivered the initial Kaplan MT Modern Medium Weight Tanks (MMWTs) to the Indonesian Army, marking the first foreign sale of the Turkish defence industry in tank class. The first batch of MMWTs is in "serial production configuration," a company official said. "All tank platforms will be shipped to Indonesia for final turret assembly and delivered to

the Indonesian Army after the final acceptance stage." After the prototype development studies, FNSS has successfully completed the endurance and firing tests carried out in Indonesia. At the end of 2019, FNSS signed a joint production contract for a total of 18 KAPLAN MT vehicles and completed the design perfection studies carried out with the participation of end users in 2020. (courtesy: gbp.com.sg)

Turkey's FNSS reveals PARS

FNSS has showcased the PARS 4×4 Anti-Tank Vehicle with ARC-T Remote Controlled Anti-Tank Turret and PARS III 6×6 with 12.7 mm SANCAK Remote Controlled Turret. FNSS, which carries out important projects in Malaysia, Indonesia and the Philippines, made its first export to the region in 2000 with the ACV project. The AV-8 8×8 project, which is a configuration of PARS 8×8 vehicles that FNSS produces with technology transfer, with its partner in Malaysia, DRB-HICOM Defense Technologies (Deftech) constitute an important element of the Malaysian Army Mechanised Infantry and Armoured Units with 12 different configurations. (courtesy: gbp.com.sg)

Gozen Holding orders 100 Vx4 for Turkey

Avolon, the international aircraft leasing company, announced that Gözen Holding, one of Turkey's leading aviation conglomerates and owner of Freebird Airlines, has committed to purchase or lease up to 50 VX4 eVTOL aircraft from Avolon, with the option to purchase or lease up to 50 additional aircraft. As a result of this announcement, Avolon has now placed its entire 500 VX4 eVTOL aircraft orderbook, with the orderbook being oversubscribed by 50 options.

Rheinmetall unveils its new AMMR

Rheinmetall has unveiled the Oerlikon AMMR, the Group's latest radar system. The Oerlikon AESA Multi-Mission Radar (AMMR) was developed entirely at Rheinmetall Italia in Rome, underscoring once again the subsidiary's role as Rheinmetall's radar centre of excellence. The new radar is now ready for series production.

Gray Eagle-ER UAS upgraded for multi-domain operations

In February 2022, General Atomics-Aeronautical Systems began the first installation of factory upgrades to a Gray Eagle-Extended Range (GE-ER) Unmanned Aircraft System to enhance its capabilities to support Multi-Domain Operations (MDO). The US Army-funded programme includes two aircraft. Flight test and qualification will start later this year.

Leonardo in next stage of AW159 Wildcat support

Leonardo will deliver the next stage of the Wildcat Integrated Support and Training (WIST) contract to the UK, which confirms the next five-year period of the 34-year contract originally signed in 2012. This £360 million contract awarded last year marks the continued delivery of support services for the UK's fleet of AW159 Wildcat helicopters to the British Armed Forces.

Diehl Defence and Hensoldt in cooperation

The system houses Diehl Defence and Hensoldt have agreed to intensify their cooperation in the field of ground-based air defence. Based on proven joint systems that are currently in production and can be delivered at short notice, the two companies intend to offer top-class products for defence against missile threats. These air defence systems employ the latest technologies, thus offering defencive potential even against new and emerging threats.

flyExclusive for 30 Cessna Citation CJ3+

Textron Aviation announced it has entered into a purchase agreement with Exclusive Jets, LLC, operating as flyExclusive, for up to 30 Cessna Citation CJ3+ jets. flyExclusive, a leading provider of premium private jet charter experiences, expects to take delivery of five aircraft in 2023, with the option to purchase additional aircraft for deliveries through 2025.

Successful demo of hypersonic air-breathing weapon concept

The Defence Advanced Research Projects Agency (DARPA), Air Force Research Lab (AFRL), Lockheed Martin and Aerojet Rocketdyne team successfully flight tested the Hypersonic Air-breathing Weapon Concept (HAWC). This historic flight reached speeds in excess of Mach 5, altitudes greater than 65,000 feet and furthers the understanding of operations in the high-speed flight regime.

Missile strike capabilities for the ADF

The Australian Government has approved the accelerated acquisition of improved weapon capabilities for the Australian Defence Force (ADF) at a total cost of $3.5 billion. This includes the Joint Air-to-Surface Standoff Missile Extended Range (JASSM-ER) for the Royal Australian Air Force, the Naval Strike Missile (NSM) for the Royal Australian Navy's surface fleet and maritime mines to secure Australia's ports and maritime approaches. Acquisition of the Kongsberg NSM to replace the Harpoon anti-ship missile in the ANZAC Class frigates and Hobart Class destroyers provides a significant enhancement to Australia's maritime strike capability – more than doubling the current maritime strike range of our frigates and destroyers.

Cutting of first steel plate of Spain's F-110 frigate

Navantia has started the construction process of the new F-110 class frigate for Spanish Navy, with the cutting of the first steel plate in an event presided by Spanish Prime Minister Pedro Sánchez. The programme, whose implementation order was signed in 2019, foresees the construction of five frigates, valued at 4,320 million euros. The F-111 will be commissioned in 2027 and deliveries will take place yearly. The F-110 frigates for the Spanish Navy are multi-purpose escort ships, with anti-aircraft, anti-surface and anti-submarine capabilities to perform their force protection and naval power projection duties. They will operate in combination with other units, and they are versatile platforms that can also perform functions related to maritime security and support to civilian authorities.

Qatar's first two NH90 NFHs delivered

The first two NH90 helicopters, dedicated to naval missions, of the Qatar Emiri Air Force have been delivered from Leonardo's Venice Tessera final assembly line (Italy). The Qatar Emiri Air Force is one of the NH90 End Users to operate both the TTH and NFH versions of the NH90 for a number of land operations and naval missions. As well as acting as prime contractor for the overall programme, Leonardo is responsible for the final assembly and delivery of the 12 NH90 NFH helicopters from its Venice Tessera facility.

GA-ASI for Japan CG RPAS project

General Atomics Aeronautical Systems has been selected to support the Japan Coast Guard's (JCG) RPAS Project. Operations will feature GA-ASI's MQ-9B SeaGuardian and begin in October 2022. SeaGuardian will be used to conduct wide-area maritime surveillance to support JCG's missions, which include search and rescue, disaster response, and maritime law enforcement.

British Army to get another 100 Boxers

The British government, represented by the European procurement organisation OCCAR, and ARTEC, a consortium of Rheinmetall and Krauss-Maffei Wegmann (KMW), have signed a contract extension to supply the British Army with an additional 100 Boxer wheeled armoured vehicles. The contract encompasses three previously ordered variants of the Boxer: the infantry carrier, the command vehicle and the field ambulance. In issuing the order, the United Kingdom is exercising an option contained in the contract signed in 2019 for the Mechanised Infantry Vehicle (MIV) procurement project, which includes 523 Boxer wheeled armoured vehicles in several variants.

Nigeria for AH-1Z's

The Government of Nigeria has requested to buy twelve AH-1Z attack helicopters; twenty-eight T-700 GE 401C engines (24 installed, 4 spares); and two thousand Advanced Precision Kill Weapon System (APKWS) guidance sections.

Angola orders 3 Airbus C295s

The Republic of Angola has placed a firm order for three Airbus C295s to perform multirole operations. Two aircraft will be specifically equipped for maritime surveillance and one for transport missions. The aircraft configured for transport missions will be able to carry out tactical cargo and troop transport tasks, paratrooping, load dropping or humanitarian missions.

HENSOLDT wins contract for Eurofighter service

HENSOLDT has been awarded a contract for the next phase of Eurofighter maintenance. The contract covers service tasks for HENSOLDT's share of various Eurofighter systems in the areas of radar, self-protection and avionics. The full service flight hour contract is organised through consortial partnerships in the four Eurofighter core nations (UK, Italy, Spain and Germany) and mandated through several national contracts via the Eurofighter partner companies (Airbus GE, Airbus SP, BAE Systems UK, Leonardo Aircraft Division IT).

Airbus and ITA Airways for urban air mobility

Airbus and ITA Airways have signed a Memorandum of Understanding to collaborate on urban air mobility (UAM) in Italy. The two companies will explore the creation of tailored UAM services, by identifying strategic use cases for emission-free mobility solutions. The agreement foresees a joint approach toward local mobility stakeholders in order to onboard additional partners for the safe and sustainable launch of operations with the CityAirbus NextGen electric vertical take-off and landing (eVTOL) aircraft, currently in development.

Qantas confirms future Airbus fleet

Australia's Qantas Group has confirmed that it will order 12 A350-1000s, 20 A220s and 20 A321XLRs. The A350-1000 was selected by Qantas following an evaluation known as Project Sunrise and will enable the carrier to operate the world's longest commercial flights. These will include linking Sydney and Melbourne with destinations such as London and New York non-stop for the first time ever. Featuring a premium layout, the A350 fleet will also be used by Qantas on other international services. The A350-1000 is powered by the latest generation Trent XWB engines from Rolls-Royce.

News from Safran

MCO contract for French helicopter engines for 10 years

Safran Helicopter Engines and the French Aerospace Maintenance Agency (DMAé, Direction de la Maintenance Aéronautique) have renewed for 10 years their contract to maintain the French government's helicopter engines in operational condition. Designated Saturne (Soutien Avancé des Turbines de l'Etat), the contract ensures the availability and MRO (maintenance, repair and overhaul) of all 1,500 engines powering the helicopters of the French Army's Light Aviation (ALAT), the French Air and Space Force, the French Navy, the Sécurité Civile, Gendarmerie, Customs and the DGA Essais en vol.

The contract covers most of Safran's helicopter engines, including the Arrano 1A powering the new H160M Guépard being developed for the HIL (Hélicoptère Interarmées Léger) programme, as well as the H160 operated by the French Gendarmerie Nationale and DGA Essais en vol.

Contract to supply portable optronics to the ADF

Safran Electronics & Defense Australasia has been awarded a contract by Collins Aerospace to provide its full suite of advanced portable optronics to the Australian Defence Force (ADF) as part of the Land 17 Phase 2 Digital Terminal Control Systems (DTCS) Capability Assurance Programme. Safran will complete delivery of this equipment by mid-2023. Through this contract Safran continues its long-standing support of Collins Aerospace and the ADF. Safran's JIM Compact, Moskito TI and Sterna systems, along with tripods, will all be integrated by Collins Aerospace into the ADFs next generation DTCS.

Agreement with AURA AERO on INTEGRAL and ERA

Safran Electrical & Power and AURA AERO, digital and eco-efficient aircraft manufacturer, have announced an agreement to work together on the architecture and electric propulsion systems of two aircraft: the INTEGRAL E training aircraft and the ERA (Electric Regional Aircraft). Safran will supply the propulsion system for the INTEGRAL E flight demonstrator (the electric version of the INTEGRAL). This is the aerobatic-capable two-seater training aircraft developed by AURA AERO. This prototype will feature a smart ENGINeUS electric motor able to deliver more than 100 kW, and the GENeUSGRID distribution and protection system. The whole system will produce zero CO2 emissions and will generate less noise than conventional aircraft. Around sixty or so orders are already expected for the INTEGRAL E. The first flight is scheduled for 2022 and deliveries are slated for 2023.

Agreement with Diamond Aircraft to provide motor

Safran and Diamond Aircraft have announced a cooperation agreement to equip the eDA40 all-electric training aircraft with an ENGINeUS electric smart motor.

The world of Airbus

Airbus selects Avio Aero engine solution for Eurodrone

Following a competitive tender process as well as an extensive technical analysis phase, Airbus has selected Avio Aero from Italy to power the Eurodrone unmanned aerial system with its engine and propeller solution, dubbed Catalyst. The Catalyst is an engine proven in flight, entirely developed and manufactured in Europe. As well as the Eurodrone programme, this engine has been conceived as 100% ITAR-free (International Traffic in Arms Regulation), thus enabling independence on export chances and avoiding additional requirements prior export clearance.

VSR700 autonomous take-off and landing capabilities tested at sea

Airbus Helicopters has begun trialing autonomous take-off and landing capabilities at sea for the VSR700, an unmanned aerial system (UAS) being developed in the frame of the SDAM (Système de drone aérien de la Marine) programme, conducted by the DGA (Direction générale de l'Armement - the French Armament General Directorate) for the French Navy. Trials were conducted using an optionally piloted vehicle (OPV) based on a modified Guimbal Cabri G2 equipped with the autonomous take-off and landing (ATOL) system developed for the VSR700. This flight test campaign paves the way for the upcoming demonstration of the VSR700, at sea, onboard a French Navy frigate.

First A380 powered by 100% Sustainable Aviation Fuel takes to the skies

Airbus has performed a first A380 flight powered by 100% Sustainable Aviation Fuel (SAF). The flight lasted about three

hours, operating one Rolls-Royce Trent 900 engine on 100% SAF. 27 tonnes of unblended SAF were provided by Total Energies for this flight. The SAF produced in Normandy, close to Le Havre, France, was made from Hydroprocessed Esters and Fatty Acids (HEFA), free of aromatics and sulphur, and primarily consisting of used cooking oil, as well as other waste fats. This is the third Airbus aircraft type to fly on 100% SAF over the course of 12 months; the first was an Airbus A350 in March 2021 followed by an A319neo single-aisle aircraft in October 2021. All Airbus aircraft are currently certified to fly with up to a 50% blend of SAF mixed with kerosene. The aim is to achieve certification of 100% SAF by the end of this decade.

5th of 7 C295 delivered to the Philippine Air Force (PAF)

PAF ordered a fleet of new-generation C295 tactical airlifters as part of its medium-lift aircraft acquisition programme. These new combat proven C295s will be dedicated for troops and equipment transportation across the country. PAF has been successfully deploying the C295 for a variety of transport operations, and humanitarian assistance and disaster relief missions, thanks to its access to short unpaved airstrips in remote areas, while carrying heavy payloads over long distances. With this new aircraft and the other two soon to join the fleet, the air force will be utilising the aircraft more extensively to enhance its air-lift operations.

BOC Aviation orders 80 A320neo Family

Global aircraft operating lessor BOC Aviation has signed a firm order for 80 A320neo family aircraft comprising 10 A321XLR, 50 A321neo and 20 A320neo. The latest agreement takes BOC Aviation's total direct orders with Airbus to 453 aircraft from the single aisle A320 Family to the A330 and A350 widebodies.

Updates from Thales

Type Certification for Spy'Ranger 330 System

The Spy'Ranger 330 in service with the French Army as part of the SMDR programme has obtained its first type certification by the French defence procurement agency's airworthiness authority, testifying to the system's proven performance in combat situations. Type certification guarantees the airworthiness of the SMDR and enables the Army to use its mini-UAS systems for instruction, training and operational deployments without obtaining specific flight approvals.

The Spy'Ranger 330 system was designed, developed and put into industrial production for the French defence procurement agency's SMDR programme by an ecosystem of French companies specialising in light unmanned air systems for front-line forces. With three times the range capabilities of its predecessor, the DRAC1 the SMDR system brings the French Army a new, strategically important capability.

Thales 70mm guided rockets in live-fire demo

Rheinmetall's Mission Master Autonomous Unmanned Ground Vehicle has once again proved its versatile capabilities in a demonstration conducted for six European allies. The Rheinmetall Mission Master SP used laser-guided FZ275 rockets from Thales in a live-fire exercise. The demonstration took place at the Trängslet base of the Swedish procurement agency Försvarets Materielverk (FMV) near Älvdalen. Delegations from Belgium, Denmark, Sweden, Norway, the Netherlands and Poland were present. The Rheinmetall Mission Master SP – Fire Support was equipped with a Rheinmetall Fieldranger Multi remotely controlled weapon station armed with two seven-tube 70mm rocket launchers from Thales Belgium, an important partner of Rheinmetall. For the demonstration, the A-UGV fired Thales FZ275 70mm laser-guided rockets (LGRs) at a 4x4 vehicle located 4 km away from the firing point. The FZ275 LGR is the lightest and longest range 70mm/2.75-inch LGR in its class, delivering metric precision and accuracy, hence providing unfailing fire support to armed forces.

Eve and Thales partnership to develop eVTOL aircraft

Eve UAM/Embraer and Thales have teamed up to support the development of Eve's electric vertical take-off and landing aircraft (eVTOL) in Brazil. The strategic partnership involves a series of joint studies over a twelve-month period, which started in January 2022, on the technical, economical and adaptable feasibility of a 100% electrically powered aircraft. Thales will also contribute with its expertise in developing avionics, electric, flight control, navigation, communication, and connectivity systems.

PT Len Industri and Thales work on Indonesia's defence sector

Indonesia has outlined an ambitious military modernisation plan through to the mid-2040s. The challenges of defending a vast archipelago amidst global threats support the country's needs to focus more resources on strengthening its overall defence capabilities. In support of Indonesia's strong military ambitions, PT Len Industri and Thales have signed a strategic agreement for deeper collaboration in multiple defence topics.

In the frame of this agreement, PT Len and Thales will jointly explore and further develop solutions on topics including radars, Command & Control systems, military satellites, C5ISR, electronic warfare, UAVs and Combat Management Systems. For radars, the collaboration will include the planned transfer of technology for military and civilian radars, including local MRO activities, and the co-development of a national Command & Control (C2) radar.

News from Dassault

UAE contract enters into the order backlog

"On 19 April 2022 we received the first down payment of the contract for the acquisition of 80 Rafales by the United Arab Emirates. Signed on 3 December 2021 in the presence of the President of the French Republic, Emmanuel Macron, and the Crown Prince of Abu Dhabi, Sheikh Mohamed bin Zayed Al Nahyan, this contract, by its exceptional scope, attests to Dassault Aviation's technological expertise and the Rafale's unique operational qualities. It also illustrates the strength of the strategic partnership between the United Arab Emirates and France," stated the company.

This contract testifies to the 'historical and privileged' relationship between Dassault Aviation and the United Arab Emirates Air Force & Air Defence (UAE AF & AD) since its creation and reaffirms the Emirates' satisfaction with Dassault Aviation fighters as demonstrated by the modernisation of the Mirage 2000-9.

Greece acquires six additional new Rafales

Eric Trappier, Chairman and CEO of Dassault Aviation, and Vice-Admiral Aristidis Alexopoulos, Director General of Armaments and Investments of the Greek Ministry of Defence, signed in Athens, in the presence of Mrs. Florence Parly, French Minister of the Armed Forces, and Mr. Nikolaos Panagiotopoulos, Greek Minister of National Defence, a contract for the acquisition of six additional new Rafale aircraft.

This new contract, which follows Greece's acquisition of 18 Rafale in January 2021, will increase to 24 the number of Rafale operated by the Hellenic Air Force. Following the arrival at Tanagra Air Base of the first six Rafale of the Hellenic Air Force on 19 January 2022, the 18 Rafale relating to the first contract will be fully deployed in Greece by the summer 2023.The six additional Rafale will then be delivered to the Hellenic Air Force shortly thereafter, starting from the summer 2024.

Falcon 6X successfully completes cold soak trials

The Falcon 6X has completed cold weather testing, passing another major milestone towards certification, expected later this year. The test team of engineers consisting of technicians and pilots from Dassault Aviation and engine manufacturer Pratt & Whitney Canada endured bone-chilling temperatures as low as -37°C (-35° F) during the long trial runs in Iqaluit, a tundra town in the far north of Canada. These tests, which were completed at the end February, followed an initial series of cold weather tests in Iqaluit in December, when temperatures dipped as low as -25°C (-13°F). The 6X endured a total of 50 hours of Arctic cold tests and has now accumulated some 650 flight hours, and completed over 220 flights.

Updates from Embraer

Embraer and Brazilian Army for four SABER M60 radars

Embraer and the Brazilian Army have signed a contract to extend the use of SABER M60 radars for the army's Anti-Aircraft Artillery Units. This will include the acquisition of four additional radar units, in its 2.0 version, reinforcing the partnership established between the Brazilian Army and Embraer in the continuous development, implementation, and improvement of military equipment, which contributes to increasing these Units' capabilities.

Acquiring the SABER M60 radars is part of the Strategic Planning of the Brazilian Army 2020-2023 and expands the Land Forces' operational capacity. As a result of the partnership between Embraer and the Brazilian Army in developing a low-altitude anti-aircraft artillery radar, the SABER M60 Radar is 100% developed in Brazil, having entered operation in 2010 when the first units were delivered to the Army. The SABER M60 is a search radar that integrates a low-altitude anti-aircraft defence system to protect strategic points and areas, such as factories, power plants, and government facilities. With 3D technology, it has a range of 32 nautical miles and an altitude of up to 16,400 feet, with the ability to track up to 60 targets simultaneously, including automatic target detection and classification.

Embraer and Brazilian Army for Phase Two of the SISFRON

Embraer and the Brazilian Army signed a contract to develop and implement Phase Two of the Army's Strategic Programme for the Integrated Border Monitoring System (SISFRON). The SISFRON implements a sensing and command and control structure in support of Land Forces' operation, acting in an integrated way to strengthen the State's presence and capacity to monitor and act on its borders, while enhancing the performance of other government entities with responsibilities over this area.

Embraer A-29 Super Tucano fleet reaches 500,000 flight hours

Embraer has announced that the worldwide fleet of the A-29 Super Tucano aircraft has reached 500,000 flight hours. With more than 260 units delivered, the aircraft has already been selected by more than 15 air forces worldwide, including the United States Air Force (USAF), as well as several countries in Latin America, including Chile, Colombia, Ecuador, the Dominican Republic, and Brazil, the first aircraft operator in the world.

Embraer delivers modernised AF-1B to Brazilian Navy

Embraer has delivered the last modernised AF-1 fighter jet (AF-1B) to the Brazilian Navy. The ceremony was held at Embraer's industrial unit in Gavião Peixoto, in São Paulo state. Under the AF-1 programme (the Navy designation for the McDonnell Douglas A-4 Skyhawk), seven subsonic fighter jets were modernised – five single-seater AF-1Bs and two two-seaters AF-1Cs.

The AF-1 is an intercept and attack aircraft operated from airfields or aircraft carriers as a vector for the fleet's air defence. The Brazilian Navy's modernised aircraft received new navigation, weapons, power generation, computers, tactical communication, and sensor systems, including a state-of-the-art multi-mode radar and a new operating system. In addition to the modernisation, the revitalisation of the cell was carried out, increasing the aircraft's useful life.

Embraer promotes its defence portfolio in Philippines

Embraer promoted its complete portfolio of products and innovative solutions for the defence and security markets at the Asian Defense & Security (ADAS), in the Philippines, held between April 27 and 29. Embraer's Defense & Security has the 'most modern product portfolio and solutions' in the industry, which include the multi-mission transport aircraft C-390 Millennium and the A-29 Super Tucano light attack and training aircraft, in addition to broader solutions for air, land, sea, space and cyber domains.

Since its first delivery to the Brazilian Air Force (FAB), in 2019, the KC-390 Millennium multi-mission aircraft has proven its capability, reliability and outstanding performance on domestic and overseas missions. FAB's current fleet of Embraer KC-390s stands at five. These aircraft have exceeded 5,000 flight hours in operation, which means more than 600 flight hours per year by each aircraft, with a mission completion rate of 97%, showing outstanding productivity in its category. The aircraft has already selected by two NATO nations: Portugal and Hungary.

Embraer recently celebrated that the worldwide fleet of the A-29 Super Tucano aircraft has reached 500,000 flight hours. With more than 260 units delivered, the aircraft has already been selected by more than 15 air forces worldwide, including the Philippines, which currently has a fleet of six A-29 Super Tucano aircraft. The fleet of aircraft were delivered in 2020 during the global pandemic, reflecting Embraer's commitment to the Philippine Air Force.

Developed in response to the demanding requirements of the Brazilian Air Force (FAB), the A-29 Super Tucano can perform a broad range of missions that include light attack, aerial surveillance and interception, and counterinsurgency. The A-29 is rugged and versatile, being able to operate from remote and unpaved runways on advanced operational bases in hostile environments with little support—all with low operating costs and high availability.

A global aerospace company headquartered in Brazil, Embraer has businesses in Commercial and Executive aviation, Defence & Security and Agricultural Aviation. The company designs, develops, manufactures and markets aircraft and systems, providing services and support to customer after-sales. Since it was founded in 1969, Embraer has delivered more than 8,000 aircraft. On average, about every 10 seconds an aircraft manufactured by Embraer takes off somewhere in the world, transporting over 145 million passengers a year. Embraer is the leading manufacturer of commercial jets up to 150 seats and the main exporter of high value-added goods in Brazil. The company maintains industrial units, offices, service and parts distribution centres, among other activities, across the Americas, Africa, Asia and Europe.

(Text and photos courtesy: Embraer. The images are of the KC-390 and Super Tucano)

Lockheed Martin news

Super Hercules milestone with delivery of 500th C-130J

Hercules history was made once again, with the announcement that Lockheed Martin had recently delivered its 500th C-130J Super Hercules airlifter. This Super Hercules (Lockheed Martin aircraft #5934) is a C-130J-30 aircraft assigned to the 130th Airlift Wing located at McLaughlin Air National Guard Base in Charleston, West Virginia. The 130th Airlift Wing is a longtime C-130 operator that is currently modernising its legacy Hercules fleet with C-130Js.

The US government operates the largest C-130J Super Hercules fleet in the world. This delivery represents the US government's continued transition to the C-130J as the common platform across the Air Force, the Marine Corps and the Coast Guard. The C-130J Super Hercules is the current production model of the legendary C-130 Hercules aircraft: "the airlift choice of 26 operators in 22 nations, the global C-130 fleet has surpassed more than 2 million flight hours and holds more than 54 world records".

Defined by its versatility, there are 17 different mission configurations of the C-130J that includes transport (military and commercial), humanitarian aid delivery, aerial firefighting, natural disaster relief support, medevac, search and rescue, weather reconnaissance, and aerial refueling.

Spain for MH-60R helicopters with support

The US State Department has made a determination approving a possible Foreign Military Sale to the Government of Spain of MH-60R Multi-Mission Helicopters with Support and related equipment for an estimated cost of $950 million. The Department of State has approved the possible sale to the Government of Spain of eight (8) MH-60R helicopters; twenty (20) T-700-GE-401C engines (16 installed, 4 spares); thirty-two (32) AGM-114R(N) Hellfire missiles, all up rounds; two (2) Hellfire II Captive Air Training Missiles (CATM); one hundred (100) WGU-59/B Advanced Precision Kill Weapon System (APKWS) II Guidance Sections, all up rounds; eight (8) Link 16 Multifunctional Information Distribution Systems Joint Tactical Radio Systems (MIDS JTRS) (8 installed); and four (4) Airborne Low Frequency Sonars (ALFS) (4 installed on 4 aircraft) etc.

Bulgaria for F-16 C/D Block 70s

The US State Department has also made a determination approving a possible Foreign Military Sale to the Government of Bulgaria of F-16 C/D Block 70 Aircraft and related equipment for an estimated cost of $1.6 billion. The Government of Bulgaria has requested to buy four (4) F-16 C Block 70 aircraft; four (4) F-16 D Block 70 aircraft; eleven (11) F100-GE-129D engines (8 installed, 3 spares); eleven (11) Improved Programmable Display Generators (iPDG) (8 installed, 3 spares); eleven (11) AN/APG-83 Active Electronically Scanned Array (AESA) Scalable Agile Beam Radars (SABR) (8 installed, 3 spares) etc.

8th THAAD battery for US Government

Lockheed Martin has received a contract totaling $74 million to produce the Terminal High Altitude Area Defense (THAAD) Weapon System for the Missile Defence Agency (MDA). The award amount covers the production of an eighth THAAD battery for the US government. It's expected to be fielded by 2025. The first THAAD Battery (Alpha Battery, 4th Air Defence Artillery Regiment, 11th Air Defence Artillery Brigade) was activated in May 2008 and the seventh THAAD battery was activated by the US Army in December 2016.

Israel defence industry updates

IWI launches 7.62X51mm Ace Sniper S.A Rifle

IWI - Israel Weapon Industry - a member of the SK Group founded by Mr. Samy Katsav, and worldwide leader in the production of combat-proven small arms for governments, armies, and law enforcement agencies around the world – has announced the launch of the Ace Sniper S.A Rifle. Based on the proven platform of the known Galil-Ace, the semi-automatic rifle with its advanced ergonomics design provides the user with the greatest accuracy and rapid engagement, even in harsh environmental and weather conditions.

Additional features include a full-length top Picatinny rail (460mm), along with M-Lock system at 3, 6 and 9 o'clock, and an adjustable folding bipod that can easily be flipped into the required position, giving the shooter more flexibility to adjust to any shooting situation. The MIL.-STD magazine is easy to insert into the Sniper rifle and, with a capacity of 20 rounds, enables the user to be more effective over an extended period of time. The rifle is adaptable to all zoom riflescopes available today for medium to long-range shooting. A locking mechanism prevents any harm or injury to the shooter in case of bullet explosion out of the chamber, and a bolt carrier tail prevents the hummer reaching the firing pin before locking has been completed.

IAI air defence radars for Czech Republic

Israel Aerospace Industries (IAI) has supplied the Czech Republic, via its Czech partners RETIA and VTU, with the first air defence Multi-Mission Radar (MMR), as part of a deal signed in December 2019 by the Ministries of Defence of both the Czech Republic and Israel. The radar, which is operational and combat-proven in Israel, provides both surveillance and defence capabilities to customers around the world, and is integrative with NATO systems.

The radar detects and classifies threats, and supplies weapons systems with the data necessary to neutralise a number of those threats simultaneously. Thanks to the system's advanced tracking capabilities, the radar provides situational awareness which is both precise and reliable, and includes the detection and identification of targets having low signatures.

IAI SATCOM terminals for fighter aircraft

Israel Aerospace Industries (IAI) has completed the delivery of dozens of SATCOM (Satellite Communication) terminals with a conformal electronically-steered antenna for fighter aircraft. The SATCOM terminals are based on AESA (Active Electronic Scanned Array) technology, and are installed on advanced 4.5 generation Western fighter jets.

IAI's beyond line-of-sight solution ensures seamless voice and data communications, at any location, and even during fast,

low-altitude flight. Utilising a unique flush-mounted antenna, the compact AESA SATCOM system eliminates antenna and radome drag, and is therefore optimally suited to a fighter aircraft's aggressive flight envelope, as well as to other platforms requiring low-drag performance. By relying on a single LRU phased array, the technology is installed and integrated smoothly and ensures a low life cycle cost. With a high-performance and robust network design, the system connects hundreds of registered users, and switches seamlessly between frequencies, at any given moment, according to the mission scenario and requirements.

Elbit to provide artillery munitions production line

Elbit Systems announced that it has been awarded contracts with an aggregate value of approximately $130 million to deliver an artillery munitions production line in a country in Asia-Pacific. The contracts will be performed over a period of 2.5 years. Under the contracts, Elbit Systems will build a turnkey industrial complex for enhanced manufacturing of artillery munitions.

Elbit System results

Revenues for the year ended 31 December were $5,278.5 million, as compared to $4,662.6 million in the year ended 31 December 2020. The majority of the revenues in 2021 were in the airborne systems and C4ISR systems areas of operation. The increase in revenues in the area of airborne systems was mainly a result of sales of airborne precision guided munitions in Asia-Pacific. The growth in revenues in the C4ISR systems area was mainly due to Sparton, a US subsidiary acquired and consolidated in the Company's results from the second quarter of 2021. On a geographic basis, the increase in North America was mainly a result of higher sales of airborne systems and Sparton's products, as well as growth in sales of medical instrumentation. The increase in Asia-Pacific was due to sales of airborne precision guided munitions.

Elbit Systems PULS Launcher

Steadicopter and Smart Shooter unveil Golden Eagle

Steadicopter, a leader in the Rotary Unmanned Aerial Systems (RUAS) industry, and Smart Shooter, a world-class designer, developer, and manufacturer of innovative fire control systems that significantly increase the accuracy and lethality of small arms, have unveiled the Golden Eagle - the first-ever unmanned helicopter with precise hit capabilities.

Based on the Black Eagle 50E platform, the Golden Eagle incorporates AI-based technology and Smart Shooter's SMASH Dragon system. The AI-based technology enables situational awareness and autonomous multi-target classification and tracking. The SMASH Dragon, a remotely-operated robotic weaponry payload, locks on the target, tracks it and ensures precise target hit.

SMASH Dragon integrates a unique stabilisation concept with proprietary target acquisition, tracking algorithms and sophisticated computer vision capabilities that allow accurate hitting of static and moving targets while mounted onto the Golden Eagle. The system can employ various types of assault rifles, sniper rifles, 40mm and other munitions with great precision.

EuroTrophy GmbH for Trophy APS is established

EuroTrophy GmbH, a new German-based company for the marketing, sales and production of the advanced Active Protection System (APS) for wheeled and tracked armored vehicles "Trophy" was incorporated on 28 March by Krauss-Maffei Wegmann (KMW), General Dynamics European Land Systems (GDELS) and Rafael Advanced Defense Systems (Rafael).

EuroTrophy GmbH focuses its business activities on NATO and EU customers in Europe. The company will also provide qualified vehicle integration services and related through-life support for the APS.

A transfer of technology will allow for the local production of the Trophy APS in Germany.

Rafael discloses results

Rafael Advanced Defense Systems Ltd. has released its financial results for the 2021 fiscal year as was approved by the company's Board of Directors, with a total of $3.075 billion in sales and a net profit of $133 million. In 2021, Rafael registered over 4.7 billion dollars in orders, and its order backlog was 7.1 billion dollars, equivalent to 2.5 years of sales activity. For the first time, Rafael incorporated the financial reports of its subsidiaries Aeronautics and Controp.

"Also this year, we continued to ensure and enable the technical-operational superiority of the IDF and the defence establishment as a whole; which was further reflected in the fact that during Operation Guardian of the Walls, we once again saw the extraordinary commitment, dedication and professionalism of Rafael's employees. Our employees have been and will continue to be the driving force powering the machine that is the spirit and energy of Rafael," stated company officials.

Rafael's high-power laser air defence system "Iron Beam"

Rafael, alongside the Ministry of Defence's Directorate of Defence Research and Development (DDR&D) have successfully completed a series of ground-breaking tests with a high-power laser interception system against steep-track threats. The demonstrator successfully intercepted UAVs, mortars, rockets, and anti-tank missiles in various scenarios.

Rafael's Iron Beam provides Israel with a capability unlike one seen elsewhere in the world by successfully developing a high-

power laser technology at an operational standard with operational interception capabilities. The tests are the first phase of a multi-year programme led by the DDR&D and defence industries. The programme aims to develop a high-power ground and aerial laser system equipped to deal with long-range, high-intensity threats. The laser will complement the "Iron Dome" system and will be an effective and economically efficient addition to Israel's multi-tiered air defence array.

Israel Shipyards presents one-stop-shop capabilities

The company provides complete, customised, and cost-effective defence and security solutions to meet customer needs for the naval arena. The company has three main vessel families, all operationally proven, mission-ready and in use by naval and law enforcement forces around the world: The SHALDAG Fast Patrol Vessel family (which includes the SHALDAG MK V – defends against seaborne terrorism and illegal activities, and assists law enforcement with protection of coastal areas and EEZs), the Offshore Patrol Vessel (OPV) family (which includes the OPV-45 – enables open sea patrol and surveillance operations and strategic asset protection) and the Corvette family based on SA'AR class vessels (which includes the S-72 – provides a wide range of capabilities that will be required in future combat scenarios).

In addition to shipbuilding, the company provides full design and maintenance services for all types of maritime vessels and offers Transfer of Technology Services including shipbuilding, ship maintenance, and construction of customer shipyard facilities.

Rafael live demonstration of ABS system

Rafael Advanced Defense Systems participated at the IT²EC Exhibition in London conducting a first-ever live demonstration of its sophisticated ABS System – a Live Virtual Constructive (LVC) solution which was also unveiled for the first time at a global exhibition. In addition, Rafael presented its advanced air defence training and simulation tools, most notably the Air Defence Optimiser (ADO). Both the ABS System and the ADO have a long-standing operational legacy.

IAI and Hyundai to supply Philippine Navy with ALPHA 3D radar

Israel Aerospace Industries (IAI) and Hyundai Heavy Industries have signed an agreement to supply the Philippine Navy with IAI's ALPHA 3D Radar Systems. The systems will be integrated on the Philippine Navy's new Corvette ships. Developed by IAI's ELTA Division, the ALPHA 3D Radar System is a lightweight, multi-function 3D AESA radar, which shares technology with its larger sibling, the MF-STAR radar. With its modular construction and fully digital software-driven architecture, the ALPHA delivers low LCC together with the cost-effective ability to implement future upgrades, mainly through software updates, ensuring the ability to cope with new threats over the system's extended service life. IAI's family of naval radar technology is operational and combat-proven in navies around the world.

IWI highlights new generation of its revolutionary riot-control protective suit, the GAL VPS. Joining up with the Special Operations team of West Virginia DCR, the company will provide a comprehensive tactical and technology experience for law enforcement & corrections personnel. Part of the MOC Prison Riot Event, the training sessions will demonstrate the ability of the GAL VPS to reduce trauma sustained by forces, by up to 95%.

News from Saab

The 1st serial production Gripen E's in Brazil

The first two serial production Gripen E fighters, called F-39 Gripen by the Brazilian Air Force (FAB), are in Brazil. The aircraft arrived in the country on 1 April 2022 at the port of Navegantes, and have completed their first flight in the country. The two aircraft flew from Navegantes International Airport to the Gripen Flight Test Center at the Embraer plant in Gavião Peixoto. The flights were conducted by two Brazilian Air Force pilots, who participated in training in Sweden. The flight to Gavião Peixoto lasted approximately 50 minutes and took place as planned.

For the Commander of the Brazilian Air Force, General Carlos de Almeida Baptista Junior, the arrival of the first two operational aircraft represents a milestone for the defense of Brazil's national airspace.

"The arrival of the aircraft is the result of a project that sought from the beginning to increase our deterrent capabilities, as well as having the objective to foster research and industrial development in Brazil. We now have a state-of-the-art multi-mission aircraft that will be the main asset for guaranteeing the sovereignty of Brazilian airspace," highlighted the Commander.

The new fighters will remain at the Gripen Flight Test Centre until the aircraft obtain the Military Type Certificate, thereafter they will be transferred to Anápolis for the final stages of the delivery phase. "Brazil actively participates in the development, flight test campaign and production of fighter jets, as part of the broad technology transfer package to the Brazilian defence industry. The arrival of the two serial production aircraft is a result of this great collaboration," stated Jonas Hjelm, Senior Vice President and Head of Business Unit Aeronautics at Saab.

The two fighter jets are part of the 36 Gripen aircraft acquired by the Brazilian Air Force in 2014.

MSHORAD evolves

Saab has revealed its finalised Mobile Short Range Air Defence System (MSHORAD) to meet the evolving and proliferating air threats over the battlefield. A wide range of established airborne threats such as fighters, helicopters and missiles are being joined by newer threats such as armed UAV's and loitering munitions. The need to both detect and counter them all, while deploying with speed and mobility, has been at the forefront of Saab's MSHORAD system development. Based on RBS 70 NG and Giraffe 1X multi-mission 3D radar respectively, MSHORAD's vehicle-based Mobile Firing Unit (MFU) and Mobile Radar Unit (MRU), combined with a Saab command and control (C2) system, are designed and available from Saab as its MSHORAD air defence system.

MSHORAD's rapid mobility provides for a tactical advantage to be exploited on the battlefield or to avoid enemy fires. It delivers a 360°, 75 km situational awareness and the capability to target the most challenging UAV threats thanks to Giraffe's Drone Tracker, an enhanced functionality for low, slow and small objects. The ability to destroy attackers comes from the unjammable RBS 70 NG missile system that operates at day and night, with rapid reloading in the field. MSHORAD's ease of integration means customers can choose from a wide range of vehicle types. It also has a dismounted capability such as from atop buildings where it can provide an additional form of operational advantage.

Successful system integration and test firings have already been conducted in the last 12 months in cooperation with the Czech company SVOS using their new generation of modular armoured vehicle 4x4 named MARS. Live firing demonstrations will be performed for potential customers in the near future.

Mid-life upgrade of 3rd Gotland-Class submarine

Saab has signed a contract with the Swedish Defence Materiel Administration (FMV) for the Mid-Life Upgrade (MLU) of the third Gotland-class submarine, HMS Halland. The total order value is SEK 1.1 billion. Saab will conduct an extensive MLU on Sweden's Gotland-class submarine HMS Halland, including an overhaul and upgrade of the combat system.

The Gotland-class submarines were built between 1990-1997. The Gotland-class consists of three submarines, all which have gone through minor modifications during the first part of their lifetime. HMS Halland is the final boat to go through an extensive MLU. HMS Gotland and HMS Uppland were relaunched in 2018 and 2019. The updated versions of the Gotland-class are paving the way for the most modern air-independent propulsion submarine under production today: the Blekinge-class (A26). More than 20 new systems that will be implemented in the state of the art A26 is also implemented in HMS Halland as part of the Mid-Life Upgrade, which contributes to their de-risking for the A26.

Finland for combat training simulators

Saab has signed a contract with the Finnish Defence Forces for the delivery of combat training simulators to supplement the live training solutions already installed with the customer. The total order value is approximately SEK 152 million and the order was booked in Q1 2022. The contract includes an upgrade of the Finnish military training facility in Pori brigade and its equipment, as well as other individual types of simulators with eight separate troop units. The purpose of the products ordered is to continue the use of the training simulators until the end of 2032.

Updates from Boeing

Boeing begins build on New Zealand's 1st P-8A

Boeing P-8A team members and Spirit AeroSystems employees have laid the keel beam for New Zealand's first P-8A. In total, four Boeing P-8A Poseidon maritime patrol aircraft will eventually replace New Zealand's current fleet of six P-3K2 Orion aircraft. To date, the global operating P-8 fleet has amassed more than 400,000 mishap-free flight hours.

Boeing and AH sign strategic H-47 Chinook partnership

Boeing and Airbus Helicopters have signed a Memorandum of Understanding (MOU) to partner on the H-47 Chinook in support of Germany's Schwerer Transporthubschrauber (STH) heavy-lift helicopter requirements. The new partnership between Boeing and Airbus aims at bolstering German defence readiness while supporting German industry and economic growth. The partnership will draw on the strengths and combined expertise of the world's leading aerospace companies to deliver advanced capability, readiness and innovative solutions as part of the German Chinook industry offering.

The partnership agreement builds on the existing Chinook partnership team consisting of AERO-Bildung GmbH, CAE GmbH, ESG Elektroniksystem- und Logistik-GmbH, Lufthansa Technik AG, Honeywell Aerospace and Rolls-Royce Deutschland Ltd. & Co. KG.Boeing is committed to working with German industry on aircraft sustainment, including post-delivery modifications and installations, aircraft maintenance, supply chain services, training and logistical support, as well as the potential for sub-systems Maintenance Repair and Overhaul work.

As chosen by eight NATO nations – Netherlands, Italy, Greece, Spain, Turkey, United Kingdom, Canada and the United States of America – the Chinook has proven its unique capabilities and mission readiness in multiple theatres and has delivered on many other mission requirements, including air-to-air refueling, medevac, troop transport, search and rescue and humanitarian and disaster relief, and special operations.

Lockheed Martin Sikorsky-Boeing selects Collins Aerospace

Lockheed Martin Sikorsky-Boeing has selected Collins Aerospace to provide all three seating platforms and its Perigon computer for the DEFIANT X advanced utility helicopter, a finalist for the US Army's Future Long-Range Assault Aircraft (FLRAA) competition. Collins will supply the DEFIANT X helicopter with armoured pilot and co-pilot, cabin crew and troop seats. Each Collins seating product will be lightweight, ergonomically designed for comfort and rigorously tested to meet or exceed the Army's stringent crashworthiness requirements. A long-time global leader in seating for civil aerospace applications, Collins has missionised its "industry-leading commercial technology to create differentiated rotary-wing military seating solutions to drastically improve warfighter comfort and readiness".

Boeing's Australian-Produced MQ-28A Ghost Bat

Boeing Australia has congratulated the Australian Government and Royal Australian Air Force (RAAF) on their selection of 'MQ-28A Ghost Bat' as the military designator and name for the first Australian-produced military combat aircraft in over 50 years. With a rapid development timetable of just three years from ideation to first flight, the development programme leverages advancements in digital engineering, advanced manufacturing and unique Australian supply chain technologies.

While the RAAF Loyal Wingman development programme name will phase out, Boeing's product name for global customers will remain the Airpower Teaming System. During 2022, the programme will continue to accelerate the development and testing of the MQ-28A Ghost Bat, with a focus on sensor and missionisation capabilities to deliver on RAAF commitments. These requirements will continue to expand as Boeing moves towards the aim of delivering an operational capability for the ADF.

The Deadly Russian Dagger

(Photo: Russian MoD)

The Kh-47M2 Kinzhal (Dagger) is a Russian nuclear-capable Air Launched Ballistic Missile (ALBM) and qualifies as a long-range standoff weapon. It has a claimed range of more than 2,000-km, Mach 10 speed, and an ability to perform evasive manoeuvres at every stage of its flight. It can carry both 480-kg conventional High Explosive (HE) fragmentation or 100 to 500-kT nuclear warheads and can be launched from Tupolev Tu-22M3 (Backfire) bombers or MiG-31K (Foxhound) interceptors. The Kinzhal entered service in December 2017 and has been deployed at airbases in Russia's Southern Military District and Western Military District. The missile is designed to strike United States and North Atlantic Treaty Organisation (NATO) warships, including aircraft carriers, posing a threat to Russia's strategic military assets and to destroy NATO military infrastructures like airfields as well as Command & Control (C&C) nodes protected by Ballistic Missile Defence (BMD) system by overcoming any known or planned United States BMD systems including MIM-104 Patriot, Terminal High Altitude Area Defense (THAAD) and ship based Aegis.

The missile first stage solid-propellant rocket is probably shared with OTK 9K723 Iskander-M Short Range Ballistic Missile (SRBM) and the guidance section is specifically designed for this missile offering greater range and flexibility. It has similar dimensions as the OTK 9M723 Iskander-M, the Kinzhal has a length of 8-m, a body diameter of 1-m, and a launch weight of approximately 4,300-kg. There are key distinct features from the ground-based Iskander, however, including a redesigned tail section, reduced rudders, and a special stub at the missile's tail designed to protect engine nozzles during high-speed fight.

(Photo: AP)

Within seconds from launch, the missile accelerates to hypersonic speed and performs manoeuvres at all stages of the flight to evade enemy missile defences. Guidance is inertial with possible fine adjustments by GLONASS series of satellites. The high speed of the Kinzhal likely gives it far better target-penetration characteristics than lighter subsonic cruise missiles. Being three times as heavy and almost twelve times as fast as Tomahawk cruise missiles, the Kinzhal has more than 432 times the on-cruise kinetic energy. Russian media claims the missile's range is 2,000-km when launched by the MiG-31K and 3,000-km when launched by the Tupolev Tu-22M3. An aircraft's ability to launch from unpredictable directions would strain sectored (non-360 degree) radars, such as those currently deployed with the MIM-104 Patriot system. Circular Error Probable (CEP) is 10 to 20-metres. The weapon made its public debut during the Aviadarts international contest in August 2019.

Sayan Majumdar


(Photo: researchgate.net)

Frisian Flag fighters fly!

International exercise is back

After two years of absence, the international military trainings exercise Frisian Flag was back in the air over north-west Europe early spring. With a fierce grip of the covid-19 pandemic and all its accompanying uncertainties on the global society, there was less interest of all potential involved air forces to gather in large groups, resulting into cancellation of the Frisian Flag editions of 2020 and 2021. With an improving health situation the planning for a new edition in 2022 went on and despite a new critical situation with the Russian invasion of Ukraine, the exercise was finally live!

From 28 March a variety of international fighter jets had gathered for two weeks at Leeuwarden Air Force Base in the Dutch province of Friesland. In fact all the participants had already arrived the week before. With an initial morning mission planned for the exercise start on Monday, it was essential for flight crews to do their team and individual planning the weekend before. Aircraft that arrived at Leeuwarden AFB to participate included Italian Eurofighters and Tornados, American

F-16's, French Rafale's and Mirage 2000's and Canadian CF-18's. The Dutch air force contributed with F-16's, F-35 Lightning II's, a C-130 Hercules and some AH-64D Apache helicopters. The aircraft deployed to Leeuwarden AB included additional samples for back-up reasons and secure the exercise flight operations. Fighter aircraft that only participated occasionally and mostly limited for 1 or 2 days flying from their home base, included USAFE F-35's from RAF Lakenheath, RAF Typhoons and German Eurofighters.

Other aircraft in support for Frisian Flag were mainly for transport of equipment and personal, like with USAF Hercules and Canadian CC-130, CC-150 and CC-17 and for liaison duties with Italian P-180, French TBM-700 and also a Finnish PC-12 to bring observers.

That Frisian Flag 2022 could continue per late March was far from certain in the weeks before the exercise. The earlier rising regional tensions, when Russia built up a large military presence near its borders with Ukraine, became a new threat for complete Eastern Europe when Russia moved its forces into the sovereign Ukraine state. NATO forces immediately responded to secure the situation more or less, by strengthening its forces at the east European borders. As a consequence NATO aircraft started a 24/7 presence with patrolling fighter aircraft, as well as radar and intel surveillance aircraft to monitor the frontier areas, all supported with tanker aircraft for aerial refuelling. The sudden extra need of aircraft for this NATO mission, affected countries programmes for scheduled exercise planning. In the early hectic and uncertain days it caused the cancellation of the UK organised Cobra Warrior exercise at RAF Waddington and Coningsby planned for early March. Also the annual European Aerial Refuelling Training (EART) exercise had to be cancelled due to the requested tanker capacity need for the new joint NATO effort. The EART training, organised by the European Air Transport Command (EATC), often runs in parallel with the Frisian Flag exercise bringing European and NATO tanker aircraft together to share knowledge and improving skills while working closely together. The EART 2022 training was scheduled to take place at the German air base of Wunstorf, home of Air Transport Wing 62 (LTG 62) flying the transport and tanker capable A-400M aircraft.

FF participants deployed/based at Leeuwarden:			
Country	**Aircraft**	**Home base**	**Unit**
Italy	Eurofighter	Istrana	51 Stormo / 132 Gruppo
Italy	Tornado IDS	Ghedi	5 Stormo / 154 Gruppo
France	Mirage 2000 D	Nancy	EC 3
France (Navy)	Rafale M	Landiviseau	11 F
Canada	CF-188A	Bagotville (Canada)	3 Wing / 425 sqn
USA	F-16C	Aviano (Italy)	31 FW / 510 FS
The Netherlands	F-16AM	Volkel	312 sqn
The Netherlands	F-35A	Leeuwarden	322 sqn
Civil	Falcon 20ECM	UK	Draken Europe

Moving in time, it became clear that Frisian Flag which is organised by the Dutch Air Combat Command (ACC), still had changes to fulfil its ambition in to run the exercise. Other exercises, which followed a similar path, were Cold Response in Scandinavia and Iniohos at Andravida Air base in Greece, all in the March-April time frame. Nevertheless it was also obvious that for Frisian Flag the exercise could not continue in the original set-up. Countries that initially had confirmed their presence were forced to alter their plans by reducing the number of aircraft and others deciding to fly from their home base or in a worse case they even had to withdraw from their intended participation completely. Such a final decision had to be taken by the Polish air force, which had originally agreed to join with several Mig-29 Fulcrum and F-16 aircraft. With their border directly connecting with Ukraine, the Polish AF felt the immediate need to have their fighter aircraft available for the NATO surveillance flights.

Although the unavoidable last minute changes, Leeuwarden base commander and F-35 pilot, Cmdr Johan van Deventer was pleased that the exercise still could continue in a quickly adapted way and expressed the importance of an exercise like Frisian Flag. Cmdr van Deventer explained that fighter pilots need their ongoing training

to be ready for whatever situation one never hopes it will come. However the current reality at Europe's eastern flank showed that training remained essential to be prepared and defend the freedom of the NATO members. Cmdr van Deventer, with combat name "Cake", further explained that it is in the normal daily flight operations hardly possible to train with large aircraft formations all kinds of complex scenarios in a mission and therefor it is good for pilots to join exercises like Frisian Flag to develop these skills as well.

Frisian Flag exercise leader and Dutch F-16 pilot "Joker" told journalists that a normal exercise day was composed out of a morning mission, taking of at 9.30 AM and another mission scheduled to take of at 13.30 PM. Each mission, with an overall duration of about 2.5 hours, consisted out of 30 jets which were divided in to roughly 20 aircraft for the friendly -blue- forces, and the remainder flying assets were acting as offensive and opposing -red- forces. "Joker" furthermore explained that the first week of

Although tanker and radar warning capacity for the exercise was scarce due to their move priority to the NATO contribution at Europe's east flank surveillance operation, such aircraft could occasionally join a Frisian Flag mission. Tanker involvement was mainly provided by Airbus A-330 MRTT (Multi Role Tanker Transport) aircraft from Eindhoven AB, The Netherlands, or from Cologne, Germany. Radar warning capacity was provided by Boeing E-3A AWACS from NATO Air Base Geilenkirchen, Germany as well as a French L'Armée de l'air (air force) E-3F from Base Aérienne (Air Force Base) Avord, France.

Frisian Flag missions are organised in repetitive fixed patterns. The appointed pilots for a morning mission have their

the exercise had a defensive focus, mainly with aerial fights between blue and red aircraft over the North Sea. The Frisian Flag exercise location over sea is ideal, while located very close to Leeuwarden AB and avoiding useless transit time for the aircraft. The second week had additional exercise air space available over the northern landscape of The Netherlands where other elements were added to the mission scenarios, like slow mover protection and attacking ground targets. The exercise included no practice of live weapons and although the bombing range "The Vliehors" was nearby, weapon use was only simulated. During this last week the Frisian Flag fighter aircraft also worked together with B-52's from Minot AFB, USA, currently on a temporary European deployment at RAF Fairford, UK.

large briefing and planning the day before. Short before their mission another small briefing takes place to fine tune on details and get the latest info on the weather and exercise area status. The crews participating in the afternoon wave do the same only during the morning prior to the mission. For each mission a leader is appointed and while it is a rotative role, a reasonable number of experienced pilots can get the opportunity to fulfil this responsible task. When a mission is completed it is finished with an overall mission mass-debrief, to do analyses and conclusions with all involved to see if goals have been achieved and to learn of the things which may have be done better. Participants who flew the Frisian Flag mission from their home base, joined the mass-debrief via video link.

The ability to react and adapt to the recent international crisis and in parallel making efforts to continue with large and important trainings initiatives like Frisian flag, Cold Response and Iniohos are important and effective indicators contributing to the public need of security. Initial preparations for a new edition Frisian Flag in 2023 has started as planned.

Text and photos by Peter ten Berg

Cold Response 22 and Media Flight in A330-MRTT

Cold Response 2022

Cold Response 2022 (CR 22) is a Norwegian military exercise in which invites NATO allies and partner nations to participate. The most visible part of exercise CR 22 took place between 10 March and 10 April 2022.

In early January, Allied forces came to Norway to train on how to operate under harsh winter conditions. Cold Response concluded most of this allied training, but there were some allied training in Norway even after Cold Response. The NATO alliance is the backbone of Norway's defence. Should anyone attack the country, Norway will invoke Article 5 of the North Atlantic Treaty and Norway's allies will assist militarily. A credible defence of Norway is based on Allied training and exercises in peacetime and Norway's ability to receive and host Allied support. "We depend on our allies' ability to master demanding Norwegian weather and winter conditions. To ensure this, our allies must train and exercise in Norway regularly" says the author of this article.

As of 4 March 2022, a total of 27 nations and some 30,000 soldiers had signed up for Cold Response. The 30,000 participants consisted of 14,000 land forces, 8,000 naval forces and 8,000 air forces and staff. About 220 aircraft and more than 50 vessels took part in the exercise.

In addition to military units from NATO, partner nations and the Norwegian Armed Forces, a number of Norwegian civilian agencies and organisations also took part.

Media Flight

On 22 March 2022, a media flight took place in an Airbus A330 MRTT (registration T-058) , flying from Cologne-Bonn airport (ICAO: EDDK) or the military name of this airbase: Flugplatz Wahn. The flight was organised by both the Multinational Multirole Tanker Transport Unit (MMU) and NATO Allied Air Command. The air refuelling flight delivered fuel to aircraft flying in the Cold Response exercise in Norway. After take-off, the A330 MRTT flew some 2 hours to mid Norway where several aircraft were refuelled. Six Norwegian Air Force Lockheed Martin F-35 Lightning II fighters were refuelled with the tank boom. One Swedish Air Force Saab Gripen fighter, simulated the air refuelling with the hose and drogue system, as this aircraft type was not yet certified for refuelling. Some US Marines Boeing F/A-18s were mentioned as possible receivers, but these aircraft did not show up. After the refuelling, a 2 hour flight back took the A330 back to Cologne-Bonn airport.

MMU

In 2012, the European Defence Agency (EDA) started to address the long-standing European shortfall in the air-to-air refuelling capacity. Since then, this initiative has grown into a mature programme managed by the NATO Support and Procurement Agency (NSPA), on behalf of the nations. The Netherlands and Luxembourg initially launched the programme in July 2016, with the first as the lead nation of the project. Germany and Norway joined in 2017, Belgium followed in early 2018 and Czech Republic lastly joined the MMF programme in October 2019. In 2020 Luxemburg funded the 9th A330 tanker aircraft. The MMF aircraft will be operated by the Multinational Multirole Tanker Transport Unit (MMU) comprising of military personnel from the participating countries. The unit is based at two permanent operating bases, the Main Operating Base in Eindhoven and the Forward Operating Base in Cologne-Wahn (Germany). Among the nine MMF aircraft, five will be based in Eindhoven and four in Cologne.

MMU and Cold Response 22

The Multinational Multirole Tanker Transport Unit (MMU) supported the long-planned defensive exercise Cold Response 22 in Norway. Training together with NATO allies, the main role of MMU is to provide air-to-air refuelling capabilities. Cold Response 22 ensures NATO allies are capable of carrying out complex joint operations in the harshest of environments.

Text by: Alex van Noye & Joris van Boven

Photos: Air to air photos: Alex van Noye & Joris van Boven/Stock photos of the A330 exterior: Alex van Noye & Joris van Boven/Stock photos of the A330 interior, the ARO console: MMU

NATO air policing

NATO Air Policing is a peacetime collective defence mission, which is at the very heart of NATO's founding treaty. It ensures the integrity of Allies' airspace and protects Alliance nations by maintaining continuous a 24/7 Air Policing within Supreme Allied Commander Europe's (SACEUR's) area of responsibility.

On behalf of SACEUR, Allied Air Command (AIRCOM) at Ramstein Air Base, Germany oversees the peacetime mission of NATO Air Policing. The Allied mission involves the use of the Air Surveillance and Control System (ASACS), Air Command and Control (Air C2) and appropriate air assets, so called Quick Reaction Air (Interceptor) or QRA(I) fast jets. As the term "policing" suggests, just like the national police forces on the ground respond to anything out of the ordinary – e.g. protest rally, traffic accident or property offence – NATO jets get airborne to monitor so-called events, i.e. unusual and potentially unsafe situations in the air.

NATO Air Policing scrambles respond to military and civilian aircraft that do not follow international flight regulations and approach Allies' airspace. Consequently, such aircraft create unsafe environments such as air-to-air mishaps, or these actions may indicate hostile acts such as hijackings. NATO Air Policing responses seek to ensure the safety of the airspace and its users. NATO Air Policing inside and near NATO Airspace will continue to respond to aircraft not complying with international flight regulations or aircraft operating near NATO boundaries.

NATO's Combined Air Operations Centres (CAOCs) at Uedem, Germany, and Torrejon, Spain, execute the mission. The CAOCs initiate and monitor all launches of NATO-assigned QRA(I) and report to HQ AIRCOM where all information about intercepts is registered in the Air Policing and Reporting section.

Special NATO air policing arrangements

Preserving the integrity of NATO airspace is a collective task. For NATO nations that do not have the necessary air capabilities (Albania, Luxembourg, Iceland, Slovenia, Latvia, Lithuania and Estonia – and most recently Montenegro), agreements exist to ensure a standard of airspace security within SACEUR's area of responsibility.

Since January 1, 2017, the BENELUX Air Policing arrangement for the airspace of Belgium, the Netherlands and Luxembourg means that the Belgian Air Component and the Royal Netherlands Air Force are taking turns to ensure QRA(I) fighter jets are available 24/7/365 to be launched under NATO control.

NATO's Air Policing mission in the Baltic States (Baltic Air Policing or BAP) has been executed continuously since April 2004; so far, 17 Allies have participated in this mission deploying interceptor capabilities to safeguard the airspace over Estonia, Latvia and Lithuania. BAP is a regional form of NATO's peacetime Air Policing mission, demonstrating the ability of the Alliance to share and pool existing capabilities. Like NATO Air Policing in the rest of European Allies territory, BAP is conducted to protect the integrity of Allies' airspace.

The NATO mission in Iceland – called Airborne Surveillance And Interception Capabilities To Meet Iceland's Peacetime Preparedness Needs (ASIC-IPPN) – is a peacetime mission, which is specific and unique to Iceland. Allies, in conjunction with the Icelandic authorities, have agreed that the appropriate response is to maintain a periodic presence of NATO fighter aircraft based at Keflavik to help keep Icelandic airspace safe and secure. These aircraft familiarise with the airspace and execute the NATO mission in Icelandic airspace to ensure the Alliance can conduct full-scale peacetime Air Policing activities at the shortest possible notice if required by real world events

Enhanced Air Policing (eAP) is part of NATO's Assurance Measures introduced in 2014. At the time the Alliance started implementing these Assurance Measures with the goal to demonstrate the collective resolve of Allies, demonstrate the defensive nature of NATO and deter Russia from aggression or the threat of aggression against NATO Allies. eAP missions are conducted in the Baltics, over temporarily over Romania and Bulgaria.

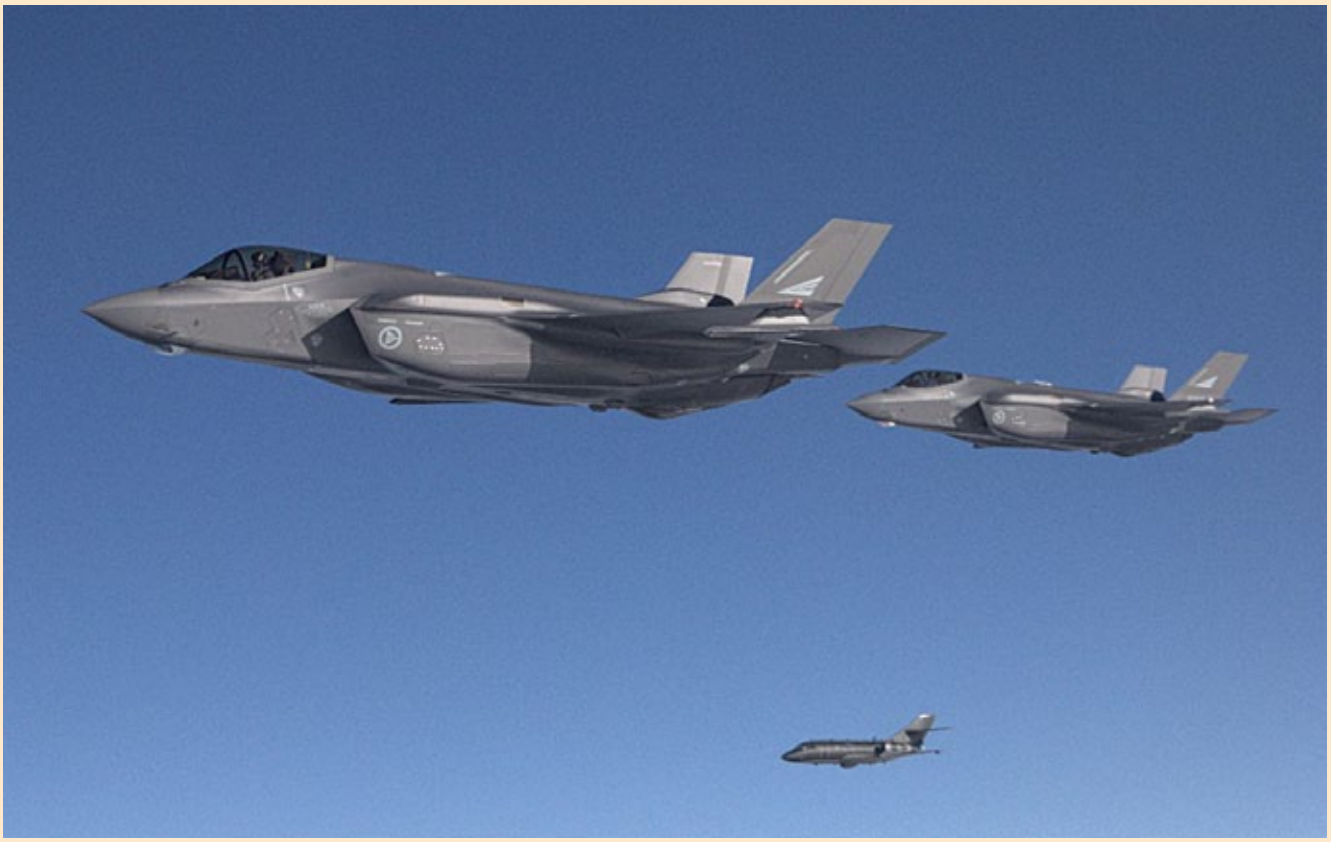
The NATO Air Policing arrangements for Albania, Slovenia, Montenegro and North Macedonia ensure a standard of airspace security for the Allies that do not have an interceptor capability in their military inventory. In Slovenia, the mission is shared by the Hungarian Air Force and the Italian Air Force, while in Albania and Montenegro, the Italian Air Force and the Hellenic Air Force provide this capability. Greece will henceforth extend their important contribution to NATO Air Policing to also cover the airspace over North Macedonia. In these cases, the fighters remain stationed at their home bases, but the CAOC at Torrejon can launch them to respond to air incidents inside the other Allies' airspace.

How does an air policing intercept work in practical terms?

Allied radars pick up a track of interest out of the 30,000 air movements daily inside the European airspace. If the corresponding aircraft is not squawking (using its transponder) or is not in radio contact with civilian air traffic control or has not filed a flight plan, the track is reported to one of the two NATO CAOCs (at Uedem, Germany, and Torrejon, Spain) which decides whether or not to launch a Quick Reaction Alert (Interceptor) aircraft from one of the Allies' air bases that are on 24/7 stand-by for such missions. Once launched the QRA(I) jet is controlled by a Control and Reporting Centre and brought up close to the unidentified aircraft.

In accordance with the respective International Civil Aviation Organization (ICAO) and NATO documents the NATO Air Policing jets conduct their scrambles professionally and predictably. This ensures that the pilot of the intercepted aircraft has visual contact and is aware of how the interception is proceeding. Ensuring flight safety is priority number one. This is further amplified by national flying regulations.

The CAOC will monitor the whole operation and report to HQ AIRCOM where all information about intercepts is registered in the Air Policing and Reporting section. All scrambles are initiated by a CAOC and conducted with NATO-assigned aircraft.



Courtesy: NATO
Air to air photos: Alex van Noye & Joris van Boven

Exercise INIOCHOS 2022

Between 28 March and 7 April 2022, the Hellenic Air Force (HAF) organised the seventh edition of the annual international INVITEX-exercise INIOCHOS 2022. All participants, except for certain HAF-squadrons, were operating from Andravida AB, home of the last Phantom II in service with the Hellenic Air Force. Participating foreign Air Forces were the Cypriot Air Force, the French Navy, the Israeli Air Force, the Italian Air Force, the Slovenian Air Force, the US Air Forces in Europe (USAFE) and the US Navy.

COUNTRY	NUMBER & TYPE(S)	UNIT	REMARKS
Hellenic Air Force	All Types	All Units	Operating from Andravida AB and their respective air bases
Cypriot Air Force	1x AW139	460 MED	
French Navy	E-2C, Rafale M	Flottilles 4F, 12F & 17F	Operating from FNS Charles de Gaulle
Israeli Air Force	11x F-16I Sufa 1x G550 Nachshon Eitam 1x KC-707 Re'em	201 Sq & 253 Sq 122 Sq 120 Sq	Operating from Nevatim AB
Italian Air Force	3x Tornado IDS 3x Tornado ECR	154° Gruppo CB 155° Gruppo ETS	
Slovenian Air Force	2x PC-9M	LeSo	
USAFE	14x F-15E 1x MQ-9A	492nd FS 31st EOG	Operating from Campia Turzii AB
US Navy	E-2D, EA-18G, F/A-18E/F	CVW-1	Operating from USS Harry S. Truman

INIOCHOS 2022 Participating Air Forces

Present as observers were: Albania, Austria, Canada, Croatia, Egypt, India, Kuwait, Morocco, North Macedonia, Saudi Arabia and the United Kingdom.

This year, the exercise differed in many aspects from previous editions. This began with the weather, with African sandstorms sweeping over Andravida, through the implementation of new tactics, to the strong influence of the current geopolitical situation. Long-term participants like the United Arab Emirates did not participate, but at the same time, new participants like Slovenia were welcomed to the growing Iniochos family.

Many speculations made the round about the reason for the United Arab Emirates Air Force not participating this year, and why the Israeli Air Force finished the exercise before the DV-day and the traditional Acropolis-Flight. The main theory is that both countries did not want to displease Turkey and thus endanger their rapprochement policy towards Ankara. Taking into account the large investments the United Arab Emirates (UAE) and Israel have made in their respective relations with Greece, in political, but also in financial terms during the last decade, this theory is not justified. The UAE have a different approach to international policy than the USA. This is particularly noticeable in the current Ukraine crisis and the different reactions. The UAE are very carefully examining geopolitical situations and have in their mind, only the best interest of their state. They are always reacting according to this principle, regardless of the pressure implied by the USA and other western allies. Therefore, the decision not to participate in INIOCHOS 2022 must been seen into the frame of a broader dispute between them and the USA regarding international politics and US-influence.

With regard to the Israeli Air Force (IAF), which finished the exercise after the first week, this is nothing new or unusual. The IAF often arrives before the official start of the exercise in Andravida and starts immediately with the training. Therefore, it is normal behaviour for them and something that happened also in previous editions of INIOCHOS.

The Romanian Air Force (RoAF) should have participated for the first time at INIOCHOS with F-16 Fighting Falcons from Escadrila 53, Fetesti AB. After many years sending observers to the exercise, it would have been the next logical step for improving their integration into NATO and learning to plan and fight with the F-16. Unfortunately, due to the current geopolitical climate and resulting increased obligations at home, they had to cancel their participation. This was a huge disappointment for all participants, knowing the fighting spirit and quick learning ability of the RoAF.

In order to fulfil the new concept of the Hellenic Armed Forces General Staff to maximise training efforts and to achieve the best possible results for all participants, INIOCHOS 2022 was carried out simultaneously with Hellenic Navy exercises and the Special Forces exercise ORION 2022 across the whole of Athens FIR (Flight Information Region). For the first time, aircraft carriers participated in an INIOCHOS exercise, namely the USS Harry S. Truman (CVN 75) and the FNS Charles de Gaulle (R 91). They brought their experience from naval operations to the exercise, and they contributed very much to the successful implementation of APCMO (Air Power Contribution to Maritime Operations) missions during the exercise. In addition to the APCMO missions, focus was given this year to APCLO (Air Power Contribution to Land Operations) missions to improve the coordination and communication between the air components and the ground components, something extremely important in the course of modern warfare.

Another big part of the exercise was the execution of OCA (Offensive Counter Air) missions. This was the field were, according to the Air Forces participating in the exercise, the Italian Air Force Tornados excelled themselves during SEAD (Suppression of Enemy Air Defences)

missions and opened the way for the other strike packages members in order to fulfil their mission targets. The aspect of CAS (Close Air Support) and JTAC (*Joint Terminal Attack Controller*) operations, day and night, is gaining more and more weight on the INIOCHOS agenda. Main beneficiaries were the Cypriot Air Force with AW139 for SPIE (Special Purpose Insertion/Extraction) missions and the Slovenian Air Force with PC-9M for CAS missions and JTAC training.

Important milestones that were reached during INIOCHOS 2022 was the first appearance of Hellenic Air Force Rafales and the execution for the first time of RRMT (Radar Recognition of Maritime Targets) missions by the Cypriot Air Force AW139 with excellent results, resulting in a huge step forward for the 460 Sq and the entire Cypriot Air Force.

The Austrian and Canadian contingents, in contrast to the other observer contingents, were fully involved in the planning phase of the daily missions. According to the Austrian contingent, one of the most important positive aspects of the exercise was that the major participants took their experience and suggestions seriously into account during the mission planning and praised them for their valuable input. Especially for smaller countries, this is something that they are not always used to and it is therefore highly viewed by them. Is it good to see, that INIOCHOS is giving slowly more weight to small-scale ground-support missions, where countries like Austria and Slovenia have often developed very innovative ideas and methods, which can surprise in a positive way the bigger players!

The foreign (non-HAF) participants praised the realistic simulation of combat scenarios, the multitude of unexpected simulated threats and the creation of a unique training environment. The main advantages from the perspective of the foreign participants were:

The missions are executed in an especially reserved airspace, which is covered by areas of high terrain, coastal and deep sea, in a contested environment with air-to-air and fixed or mobile surface-to-air threats (ground and maritime based).

The "adversaries" (RED Forces) are 4th (and 5th) generation aircraft and surface-to-air missile systems, employing BVR


878


569


482

(Beyond Visual Range) tactics and using modern EW (Electronic Warfare) and radar capabilities, within the frame of a multi-layered IADS (Integrated Air Defence System).

The possibility of training CAS scenarios in high threat areas.

The vision of the Hellenic Air Force is to constantly improve this flexible exercise concept, customised to the different training requirements of Air Forces, across the whole Joint Air Power spectrum. This flexible concept is being adapted after every exercise, according to the technical advances, worldwide operational developments and

current threat projections. A huge part of this continuous adjustment is gained from the feedback of the participating Air Forces, as well as from the lessons learned from previous exercises.

After countries like Cyprus and Slovenia made the first step, we will surely see countries like, for example, Austria fully participating in INIOCHOS in the future. Another highly probable candidate for one of the next INIOCHOS exercises is Morocco, which showed a very strong interest and sent a high-ranking delegation to observe the exercise. In addition, many rumours were circulating among high-ranking politicians and militaries about a possible Indian Air Force participation in the very near future. This would be a logical move, taking into account the rapidly improving Indo-Greek political, financial and military cooperation and the wish of France to establish a kind of military axis between France-Greece-Egypt-United Arab Emirates-India, especially after all these countries are now or will become Rafale users. Furthermore, one should not forget the increasing military cooperation between Pakistan and Turkey, which gives reason for concern in the above-mentioned countries. The future looks bright for innovative exercises like INIOCHOS!

The authors want to thank the Austrian Air Force contingent and the staff of the 460 Squadron, Cypriot Air Force for their valuable help in the preparation of this article!

Text: Marcus Vallianos / Photos: Philipp Vallianos

NATO's increased European fly ops

A joint approach to secure safety

Since the earlier slowly rising of tensions in the Russian – Ukrainian border areas, have evolved into the current war between both countries late February of this year, it had an immediate effect to the surrounding and other nearby European countries. Although the signs of Russian military forces gathering close to the Ukraine border were monitored during the months before, only a few would have thought it would lead to a new war scene. As a consequence the neighbouring countries, of which a majority is bonded being member of NATO, started to prepare their defences towards the sudden changed and uncertain regional future developments.

Radar and Intel

Next to countries national preparations, the NATO community bundled the individual efforts into a common approach in order to be prepared to defend the territory of member states against whatever future threat which may come ahead. Although near border monitoring flights of NATO intelligence and radar aircraft had become a routine and carried out on a regular base over the past decades, these flights were immediately organised into a continues ongoing day and night operation from the moment the war started on 24 February 2022. One of the key players for these flights were NATO's own E-3A Airborne Warning And Control System (AWACS) aircraft of the NATO Airborne Early Warning & Control (NAEW&C) force based at Geilenkirchen Air Base, Germany. Based on the Boeing 707 aircraft, the military NATO AWACS version has now in operations for 50 years, since 1982. For the current monitoring flights, other radar and intel aircraft include French L'armee de l'air E-3CF Sentry's from Avord air base and RAF RC-135W Rivet Joint aircraft from Waddington air base. The USAF has a variety of aircraft deployed to Europe which include U-2 Dragon Lady aircraft operating from RAF Fairford in the UK, further a rotating mixture of several versions


U.S. AIR FORCE


U.S. AIR FORCE

of RC-135 aircraft operating out of RAF Mildenhall, UK, an E-8C Joint Stars flying from Ramstein air base, Germany and additionally the US Army operates several Beech RC-12 Guardrails out of the Baltic States. On an occasional base extra support came from an Italian Gulfstream G-550 Conformal Airborne Early Warning (CAEW) aircraft, which has its home base at Pratica di Mare air base. Sweden, although not being a NATO member, is also performing monitoring flights with their Saab 340 AEWCS S100 Argus and Gulfstream S102B aircraft on a regular base. The area in which the monitoring flights are conducted, ranges from the northern Baltic States down to the southern regions of Romania, Bulgaria and Black Sea.

Fighters

In the same areas, local based fighter aircraft conduct patrol missions together with temporary detached units of other NATO allies. Some of these detachments included USAF F-15's from Seymour Johnson AB, USA as well as from RAF Lakenheath, UK together with F-35's from the same base. USAFE F-16 units from Spangdahlem AB, Germany and Aviano AB in Italy do also deploy regularly to the eastern European countries and fly patrol missions together with the fighter aircraft of local air forces. European countries who deploy on a rotational base fighter aircraft to Eastern Europe include Italy, mainly with Eurofighters from joined units, Spain with Eurofighters and F-18 Hornets, Germany also with Eurofighters, the UK with Typhoons, The Netherlands with F-35 and France with Mirage 2000's and Rafale's. Additionally the US Navy flies missions from their aircraft carrier USS Truman CVN-75 sailing in the Mediterranean.

To fulfil the on-going patrol mission requirements, it was more than welcome that an USAF unit was already on a regular deployment in Europe before the war had started. Earlier in February, 12 F-35A Lightning II aircraft from the 388th Fighter Wing at Hill AFB, had touched down at Spangdahlem AB in Germany after a trans-Atlantic flight.

Spangdahlem

The fighter aircraft included a mixture of assets from the 4th, the 34th and the 421st Fighter Squadrons. When the war started a few of the aircraft were further forward deployed to conduct their patrol missions. Later on, the aircraft continued with their patrol missions, which can last to 6 or 7 hours, from their German detachment base, Spangdahlem. Late March six USN EA-


HL

18G Growlers from VAQ-134 joined the Hill F-35's at Spangdahlem and could also been seen flying long lasting patrol missions. VAQ-134 is one of the USN land based unit which can provide support when and where needed. Recently it was announced by the USN that VAQ-134 and the other land base VAQ units will be taken out of service from 2023 on as a cost reduction measure.

That Spangdahlem is one of the European bases which is playing an important role in the operations, also with several temporary deployed KC-135 tanker aircraft at the base, was already clear. Nevertheless early May another 8 USAF F-35's from 134th Fighter Squadron of Vermont Air National Guard (ANG) arrived here. The new Lightning II aircraft will most likely be a replacement to relieve one of the units already longer on European deployment.

Air-to-air refuelling

To make all the fighter aircraft able to fulfil their several hour lasting patrol missions, a huge supporting tanker aircraft fleet is available. French and American KC-135's, Spanish and German A-400's, British Voyagers, Italian KC-767's, French A-332's, but also USAF KC-10 and KC-46 aircraft together with multinational A-330MRTT's, fly from various stations all over Europe to provide continuous aerial refuelling capacity on scene.

Overlooking the whole operation it can be assumed that the annual NATO joint training exercises for fighter, transport and tanker aircraft according mutual agreed procedures are considered as essential to be able executing multinational operations on a scale and size as we see now.

Text and photos by Peter ten Berg

US Navy and Air Force deploy to Spangdahlem AB

Due to the Russian invasion of the Ukraine, additional US air assets have been deployed to Europe. At Spangdahlem Air Base in Germany (ICAO: ETAD), both the US Air Force and the US Navy deployed additional aircraft. On 18 April 2022, the F-35s, the EA-18Gs and the KC-135s flew their missions that lasted some 4 to 7 hours.

US Navy: Six US Navy EA-18G Growlers of Electronic Attack Squadron VAQ-134 flew at the end of March to Germany, departing from Naval Air Station (NAS) Whidbey Island, Washington, USA. The purpose of this deployment is to bolster readiness, enhance NATO's collective defence posture and further increase air integration capabilities with our allied and partner nations. The Growler aircraft are equipped for a variety of missions but they specialise in flying electronic warfare missions, using a suite of jamming sensors to confuse enemy radars, greatly aiding in the ability to conduct suppression of enemy air defence operations. They will be accompanied by about 240 air crew, aircraft maintainers and pilots.

They are not being deployed to be used against Russian forces in Ukraine. They are being deployed completely in keeping with

our efforts to bolster NATO's deterrence and defence capabilities along that eastern flank. The deployment is not in response to a perceived threat or incident.

US Air Force: From Hill Air Force Base, the US Air Force sent six Lockheed Martin F-35A aircraft, pilots, maintenance crews and support personnel from the active-duty 388th and Reserve 419th Fighter wings to Germany. Within a week of the deployment, six F-35s would be forward deployed on rotation to three eastern flank countries: Lithuania, Poland, and Romania. For several days, the F-35s took off and landed from NATO countries strategically located and compatible with American aircraft. The six F-35A aircraft have since moved back to Spangdahlem for a full suite of support personnel and their own hangars. Besides the F-35s, the US Air Force located additional Boeing KC-135 refueling aircraft of the 92nd Air Refueling Wing (from Fairchild Air Force Base, Washington) at Spangdahlem Air Base; to support the F-35s and EA-18Gs overhead Europe.

Text and photos: Joris van Boven

Flying branches of the Zbroynykh Syl Ukrayiny

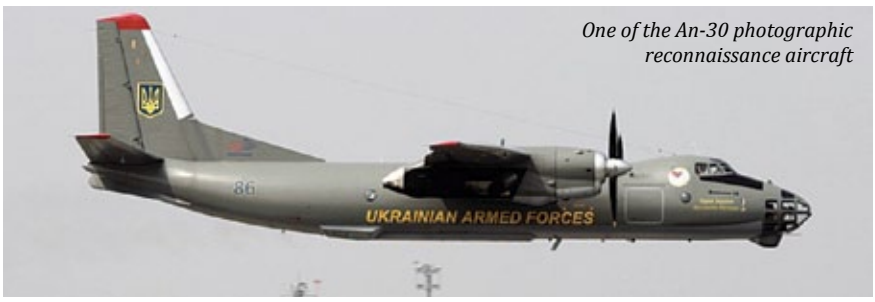
Night shot of a Su-27 'Flanker'

The current conflict in the Ukraine prompted us to give an overview of the flying branches of the Zbroynykh Syl Ukrayiny or Ukrainian Armed Forces. Focus is on operational units (fighters, transport etc.), training units are outside the scope of this overview.

Brief history

In 1991, the Soviet Union dissolved and the Ukraine became independent. Lots of former Soviet Air Force aircraft and helicopters stayed behind in the Ukraine as payment for the debts the Soviet government had, some 1500 in total. However due to a lack of pilots and maintenance personnel, many of these were withdrawn quickly. In 2003, a large reorganisation was done, which meant closure of a range of airbases and withdrawal of more aircraft types (e.g. Tu-22, MiG-23, MiG-25, Su-15 and Su-17 of the air force, Yak-38 and Ka-25 of the navy as well as Mi-2 and Mi-6 helicopters of the army). Many of the remaining aircraft however went through an extensive modernisation programme, which made more aircraft available for use. After the Russian annexation of the

An-26 called "Phoenix" that returned to service after years of storage



One of the An-30 photographic reconnaissance aircraft

Crimea in 2014, dozens more aircraft have been overhauled, modernised and returned to service. These even include two An-26 transport aircraft that have been fully overhauled by volunteers after they had been in storage for years. One of those is fittingly called "Phoenix". Furthermore, new aircraft and especially helicopters have been ordered and delivered since.

Ukraine Air Force (Povitryani Syly Ukrayiny)

The air force consists of seven fighter regiments and three transport regiments. The former have providing combat and reconnaissance support to ground forces as the main tasks, supplemented with air defence and maintaining air superiority within the national airspace during conflicts. Main tasks of the transport regiments are tactical and strategic transport during conflicts.

Three brigades operate the Mikoyan-Gurevich MiG-29 'Fulcrum': 114 BrTA (Tactical Aviation Brigade) at Ivano/Frankivs'k, 204 BrTA at Lutsk and 40 BrTA at Vasylkiv. They all consist of two squadrons and each flies the MiG-29 fighter aircraft plus a few Aero L-39 Albatross as squadron hack. Furthermore, there are two brigades with the Sukhoi Su-27 'Flanker', the only aircraft in the world that can do the famous Cobra manoeuvre. These are the 39 BrTA at Ozerne-Zhytomyr and the 831 BrTA at Myrgorod. Both brigades have two squadrons of Su-27 plus few L-39. Together these five brigades form the air defence of the Ukraine.

The airbase Mikolaev-Kulbakino on the Southern coast is shared with the naval air brigade. Their Sukhoi Su-25 'Frogfoot' ground attack aircraft have been handed over to the air force at the end of the 20th century and have been based here with the air force since. The two squadrons that operate them fall under the 299 BrTA. There is also a separate third squadron that flies the L-39 Albatros.

The last fighter brigade is 7 BrTA at Starokostiantyniv, or Staro as it is affectionately known. Based here are three squadrons with Sukhoi Su-24 'Fencer' fighter-bombers plus some L-39 Albatros. The Fencer is unique in the Ukrainian inventory as it has swing-wings, giving it supersonic capabilities, and a side-by-side cockpit for its crew of two. Probably also based here is the 383 opDKLA

Vinnytsia based An-26 air ambulance


Largest Ukrainian transport aircraft Il-76 'Candid'


Staro-based Su-24 with brake chute deployed

(Separate UAV Regiment) who were the first unit in the Ukraine to receive the Turkish built Bayraktar TB2 drones that can be armed or can be used for reconnaissance. They also operate some Soviet built Tu-141 and Tu-143 drones. These have been designed to do reconnaissance, but during the recent conflict at least a few have been crudely converted to be used with bombs attached. One of those crashed in Croatia after it malfunctioned and flew over Romania and Hungary first.

Then there is the transport capacity. Two of the transport brigades are 15 OBrTrA (Transport Aviation Brigade) at Kyiv-Boryspil and 456 OBrTrA at Vinnytsia. The different squadrons operate a few dozen Antonov An-24 'Coke', An-26 'Curl' and An-30 'Clank' cargo and reconnaissance aircraft, the Tupolev Tu-134 'Crusty' for people transport aircraft and multiple versions of the well-known Mil Mi-8 and Mi-9 'Hip' helicopters. The third transport brigade is the 25 OBrTrA at Melitopol, which operates the heavy transport aircraft of the Ukrainian air force. They have two squadrons that fly the Ilyushin Il-76 'Candid' plus a third with the smaller An-26 'Curl'. In the past also Il-78 'Midas' tanker aircraft were used, but these have been converted to regular Il-76 transport aircraft by now.

Naval Aviation Brigade (Brygada Morska Aviatsiya)

At the end of the 20th century, the navy transferred all its MiG-29 and Su-25 fighter aircraft to the air force, keeping only patrol aircraft and helicopters. From 2004 until 2014, all naval aviation units were concentrated at Saki airbase at The Crimea. When Russia invaded there in 2014, the flying units of the naval forces retreated to Mikolaev – Kulbakino, a former naval airbase now in use by the air force, leaving behind a large number of aircraft and helicopters. Most of those were in storage or maintenance and were not ready in time to be flown away. Four Kamov Ka-29 anti-submarine helicopters did make the move to Nikolaev, but since all their logbooks and maintenance records were left behind, these haven't flown since. However, other helicopters were evacuated in time or were returned by the Russians later on.

Main tasks of the naval aviation units are maritime patrol, coastal defence, anti-submarine warfare, search and rescue and

Su-27 'Flanker' taking off in evening light

Su-27 'Flanker' in old colour scheme

Flightline at Myrgorod with Su-27s

One of many L-39 used as squadron hacks

transport. The Naval Aviation Brigade consists of three squadrons. The Naval Aviation Squadron operates all fixed wing aircraft of the naval aviation forces. These comprise of 2 An-26 'Curl' transport aircraft that are actually equipped with bomb racks as well. Furthermore, there are three An-2 'Colt' plus a couple of Be-12 'Mail' flying boats. Noteworthy is that one of the An-2s has recently been donated by a private individual in an act of patriotism while another one has been confiscated after smuggling actions and then delivered to the navy. Also two more An-26s were expected, but whether these have actually been delivered before the current conflict started is unknown. The Naval Helicopter Squadron obviously operates the helicopters, which are a handful of Ka-27 'Helix', a single brand new Ka-226 'Hoodlum', four Mi-14 'Haze', another four Mi-8 "Hip' and a single Mi-2 'Hoplite'. The Hips are Mi-8MTB-V versions that have been recently upgraded by Motor Sich in Zaporizhzhya. Some older Mi-8 that had been stored for a while were also planned to be upgraded by Motor Sich, but their current status is unknown. The newest addition to the aviation brigade is the Naval Unmanned Squadron. This unit operates the Turkish built armed Bayraktar TB2 UAVs, of which the first have been delivered in 2021.

Army Aviation (Armiyska Aviatsiya)

The Ukrainian army has been an active participant in the peace keeping missions in former Yugoslavia, for which many Mi-24 and Mi-26 helicopters received a white UN colour scheme which is still visible today. After the start of the fighting in the Eastern part of the Ukraine in 2015 a modernisation programme started to update the obsolete Mi-8T to the modern and capable Mi-8MSB-V by local company Motor Sich. This amongst others includes improved engines, addition of weapon pylons and self-defence measures. More recently, just like the air force and navy, the army received the Bayraktar TB2 drones. They are operational since 2021, however it is not known yet which unit flies them.

After the outbreak of hostilities in the Donbas region in 2014, most active helicopters got two white stripes painted on the tail boom to distinguish them from

Backbone of air defence is the MiG-29 'Fulcrum'


Flightline with MiG-29s


MiG-29 being prepared for a mission

MiG-29 'Fulcrum' in the new digital colour scheme

their Russian counterparts, such as the famous 'D-day invasion stripes' which allied aircraft used in 1944. Many also lost their 'painted on serial' which was replaced by a serial on a small piece of paper behind a window. This is to make it more difficult for the Russians to figure out the number of active helicopters.

The flying component of the army consists of four brigades. The 11 OBrAA (Independent Army Aviation Brigade) is based at Cherson in the South of the Ukraine. This regiment also has two squadrons and both operate all different versions of the Mi-8 'Hip', Mi-9 'Hip' and Mi-24 'Hind'. Based at Brody is 16 OBrAA with the same structure and helicopter types as Cherson. The 7 OBrAA at Novyi Kalyniv, near the Polish border not only has two squadrons operating all different versions of the Mi-8 'Hip', Mi-9 'Hip' and Mi-24 'Hind' but also houses half a dozen Mi-26 'Halo' helicopter. However, these are believed to be withdrawn from use. Finally, there is the newest unit, 18 OBrAA at Poltava. This regiment consists of one squadron with Mi-2 'Hoplite' helicopters and another one with the Mi-8 'Hip', both mostly of the modernised MSB combat type. This airbase is located in the North-Eastern part of the Ukraine, relatively close to the troubled regions of Donetsk and Luhansk. Therefore it has been on high alert already for almost a decade, since the separatists started their fight for independence.

Giant Mi-26 in storage

Duo of MiG-29s take off for an evening mission

Upgraded Mi-8MSB-V with hovering Mi-24 in the background

State Border Guard Service of the Ukraine (Derzhavna Prykordonna Sluzhba Ukrayiny)

Next to the three regular armed services the Ukraine has a separate Border Guard. Although normally a separate unit, during wartime they fall under the command of the Armed Forces. Their main task obviously is border control, including reconnaissance and transport. Next to the in these regions common Antonov An-24 'Coke', An-26 'Curl' and An-72/An-74 'Coaler' aircraft and Mil Mi-8 'Hip' helicopters the Border Guards acquired some Western built Diamond Da.40 and Da.42 Guardian aircraft. These aircraft had been used by a Ukrainian flying school before, but were sold to the Border Guards by around 2010. Also the first Airbus H-125 helicopters of an order of 24 started arriving in 2020.

When the conflict started, about a dozen had been delivered.

The Border Guard used to have an airbase in the Crimea, but that was obviously deserted after the Russian annexation in 2014. They currently operate from Kyiv-Zhuliany, Kharkiv, Odessa and Uzhhorod.

National Guard of Ukraine (Nacionalna Hvardiya Ukrayiny)

Dissolved in 2000, the National Guard was reformed again directly after the Russian invasion of the Crimea in 2014. Its main tasks are maintaining public order and guarding sensitive locations such as nuclear power plants. Next to this they are also tasked with counterinsurgency against so-called Fifth Columns and infiltrators. As such they are actively involved in the current conflict.

Although mainly consisting of ground units, National Guard operates some aircraft also. A single brand new Antonov An-70 and two An-72 'Coaler' are the large transport aircraft, while also a few An-26 'Curl' are used. Like all military services, the Mil Mi-8 'Hip' is used for tactical transport and a few upgraded Mi-2MSB 'Hoplite' have been delivered recently. Furthermore, at least 5 out of an order of 12 Airbus H-225 helicopters have been delivered as well. The National Guard mainly operates from Kyiv-Zhuliany but has helicopter detachments all over the country if and when needed.

State Emergency Service (Derzhavna Sluzhba z Nadzvychaynykh Sytuatsiy)

Although not an active military unit, this government branch is included in this overview as their aircraft and helicopters have been very busy since the current conflict started. Flying people out of the country and probably bringing supplies back are some of their major tasks assigned. The main task of the Emergency Service is civil defence (including disaster prevention, rescue missions, firefighting and such), which is shown in their motto "To prevent. To rescue. To help." Main operating base is Nhyzin near Kiev, with small detachments at Kyiv-Zhuliany, Kharkiv and Uzhhorod. Their equipment consists of four Antonov An-32 'Clank' firefighter aircraft, the usual An-26 'Curl' and Mi-8T 'Hip' plus more modern Western built Eurocopter EC.145 (two) and Airbus H-225 (nine) helicopters.

Current conflict and future

During the conflict, many transport aircraft and helicopters have been flying to neighbouring countries and back, transporting people out of the country and supplies back to the Ukraine. The fighter aircraft are doing their job as well, defending their airspace against hostile aircraft and supporting their ground troops. In the run up to the actual outbreak of the conflict, Turkey delivered multiple armed Bayraktar TB2 drones. Actually two Turkish A.400 transport aircraft got stuck at Kyiv-Borispol aircraft on the day of the Russian entered the Ukraine and are still there over a month later. Furthermore, the European Union intended to deliver additional fighter aircraft of types that are already in use in the Ukraine (MiG-29 and Su-25). This plan was quickly abolished as the countries that were supposed to deliver them (Bulgaria, Poland and Slovakia) couldn't do so for several reasons. More recently, Poland offered their fleet of 28 active MiG-29s to the USA 'at their disposal' with the intention of the Americans delivering them to the Ukraine. However, the recent updates of this development are still pending. Instead the transfer of 16 Mi-17 'Hip' helicopters has been promised, coming from Afghan stocks. Some of these helicopters were already in the Ukraine for maintenance when the Taliban took over control in Afghanistan, the rest was flown out of Afghanistan before the Taliban could catch them.

Almost every airbase of the Ukrainian forces has been under heavy attack during the recent conflict with the amount of damage to infrastructure and aircraft currently unclear. Furthermore, also many aircraft and helicopters have been lost while fighting the Russians and it is still much too early to make up the balance. However, apart from the loss of equipment, the loss of lives is obviously a lot worse. One of these is well known former Su-27 Flanker display pilot Col. Oksanchenko, who displayed his flying skills at airshows all over Europe. He retired in 2018, but voluntarily returned to active duty after the conflict started to defend his country. He was killed in action only days after. His attitude is an example of the fighting spirit of the Ukrainian people.

All text and photos: Patrick Dirksen and Frank Mink of Tristar Aviation

Mi-24 with its deadly cannon and eagle eyes

One of the navy An-26 with bomb racks

Line up of Da.42, Mi-8 and An-26

Ka-29 in flyable condition but without paperwork

Flightline at Nhyzin, main base of the Emergency Services

Frisian Flag 2022

The annual exercise Frisian Flag took place at Leeuwarden Air Base (ICAO:EHLW) in the Netherlands from 28 March to 8 April 2022 and this year there were many foreign participants involved. Several air defence missions and ground attack missions were flown from the Frisian airbase Leeuwarden during Frisian Flag. The exercise lasted almost two weeks and the participating pilots trained to perform complex missions in international cooperation with a high intensity. Scenarios which may occur during future NATO Response Force (NRF) deployments were intensively performed. With the tensions in Eastern Europe and the war in the Ukraine in mind, this was a very important exercise for the participants; the participants took off twice a day and performed several tasks in parallel during this realistic scenario. The air defence missions were flown in airspace which is defended against invading enemy planes to maintain a No-Fly Zone. The whole northern part of the country and areas at the North Sea were designated daily for the exercise.

For the Netherlands this was the first time in history that F-35A Lightning II participated. The 322 Squadron at Leeuwarden reached its Initial Operational Capability (IOC) status last year and is now fully capable to join training scenarios as practiced in Frisian Flag; the last F-16's left Leeuwarden on 5 July 2021. This is a huge milestone for the RNLAF during the introduction trajectory of the F-35A. The American contributor this year was the participation of twelve F-16C Fighting Falcons from the Italian base Aviano. The most remarkable participant in this edition was the Canadian Air Force and it was the first time that this air force joined the exercise.

The Canadians have become more active thanks to the rising tensions (due to the

Participants

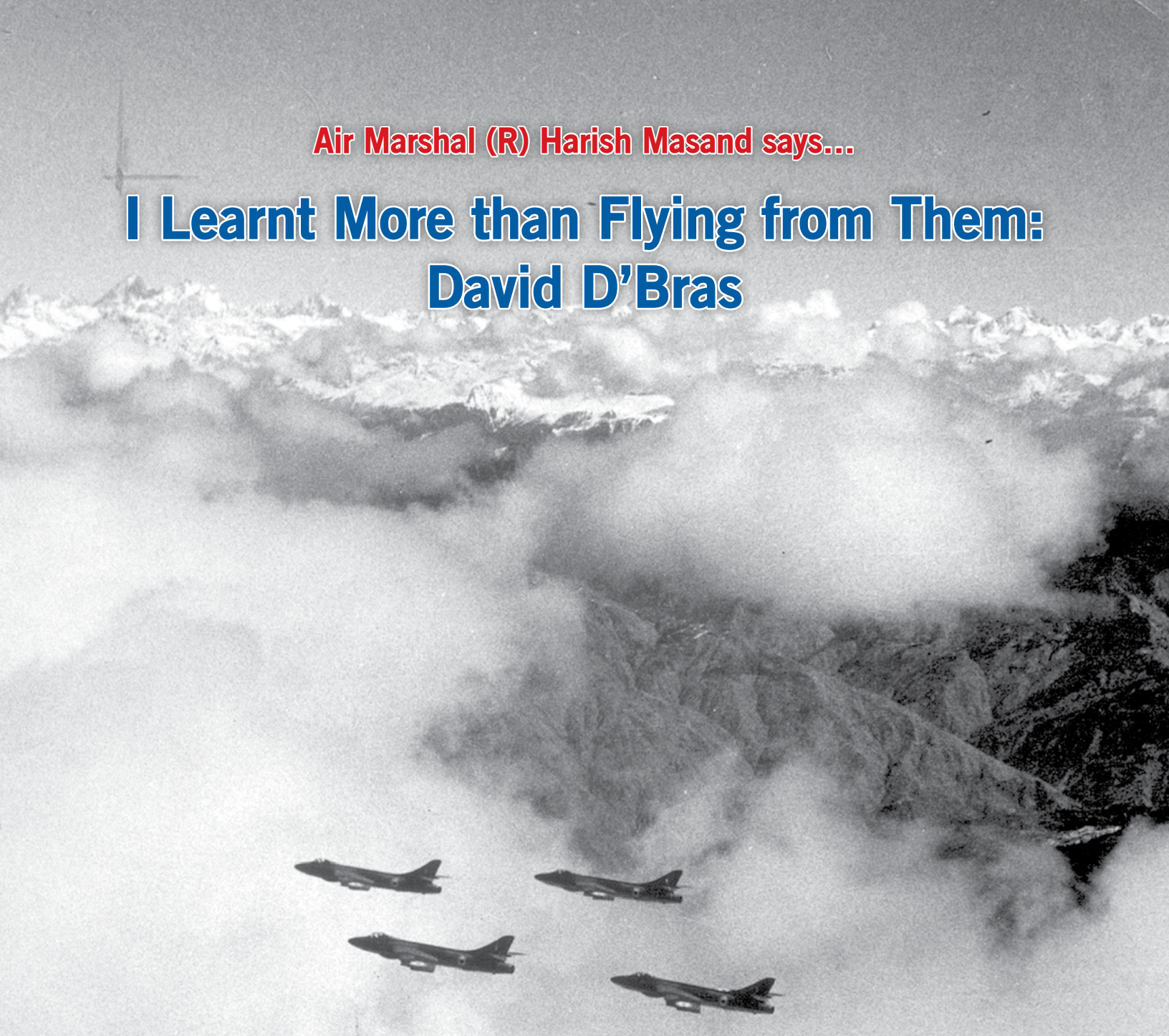
Country	Aircraft	Remark
The Netherlands	F-35 F-16 AH-64	The F-35s became IOC last january
France	Mirage 2000D Rafale M	First participation the French Navy
United States	F-16	From Aviani AB (Italy)
Canada	F-18	First participation of the Canadian Air Force
Italy	Eurofighter Tornado ECR	First participation of the Italian Air Force

conflict) and more active in Europe being a member of NATO. The Canadians already had multiple deployments in Romania in the past and are now in Europe for their next tour. Frisian Flag was for these pilots the perfect exercise to train in the European corporation. Initially the Polish Air Force was to participate but they had to cancel their contribution due to their high readiness in Poland due to the Ukrainian war. The Italians replaced the Polish Air Force by sending a few Tornado IDS and EF2000 Eurofighters for the exercise. A fixed contributor in the past years was France and this year they sent Mirage 2000D's for the exercise. Additionally, the French Navy joined by flying in their Marine Rafales.

Text: Alex van Noije & Joris van Boven
Photos: Alex van Noije

Air Marshal (R) Harish Masand says...

I Learnt More than Flying from Them: David D'Bras



IAF Hunters over the Himalayas

A little background on how I found myself in Hasimara where I came across David D'Bras and our mental and professional state is essential to this story. On 4th of December 1968, after being shunted out of Operational Training Unit (OTU) in Jamnagar with just 13 odd hours on Hunters instead of the 50 hours specified in the syllabus, I reported to 37 Squadron in Hasimara. I still recall we were about nine of us from 98 GD(P) posted to Hasimara from OTU distributed between the two operational Hunter squadrons there, 17 and 37. Amongst the memorable course mates in this lot were Anil "Sinch" Sinha, KR 'Keru" Singh, Derek Daly and JS "Jagga" Brar, the latter two going to 17 Squadron. Imagine my shock and horror on the morning of the 4th when I reported to the Squadron in my best uniform, peak cap and log book, with barely 200 hours of flying in there including training flying, and the senior lot, including the Commanding Officer, barely looked at us. The CO, then Wing Commander MM "Rusty" Sinha, just shook our hands and rushed off for flying, or whatever, saying "I would see you around" as he left. I soon realised the reason for this cold reception; I was 35th in the seniority in the squadron which normally in peace-time had 20 pilots on its strength. To top it all, we had little flying experience, particularly on the Hunter, and the senior squadron lot would be required to train us when they already had their hands full with more than 20 under training pilots senior to me even with laid-down serviceability of aircraft.

Due to such large numbers of pilots as a result of the large inductions after the 1962 War, we got little flying. Due to the regular breaks, the few sorties that I flew in the next six months till June 1969, were a

dual check, due to the break, followed by a solo handling sortie and another long break. Most of my flying was as second pilot in Dakotas at Jorhat/Kumbhigram for flying bounty, as it was called then. By June 1969, we had 52 pilots in the squadron with me still around the 33rd or so. Due to few prospects of getting flying and a lot of temptation to become an alcoholic or get onto drugs, I submitted a very polite resignation to the CO so that I could get back to my engineering course and career, having done three years of the 5 year degree course before joining the Air Force. Rusty Sinha was a little upset and didn't seem to be keen to forward my application, perhaps due to the fact that I was first in fighters in my course. I pleaded with him that the application was not meant to be against anybody or the organisation but only because the Air Force seemed to have surplus pilots. I also told him that I had got a taste of being a fighter pilot having flown the Hunter a bit and, perhaps, it was time for me to make my career in aeronautical engineering. However, Rusty Sinha asked me to first go on 45 days leave after which he promised to start my flying training in earnest. I promptly got onto my new Royal Enfield motorcycle and rode it all the way to Indore and then to Delhi and Chandigarh getting back to the squadron in early August, feeling quite like the Easyrider.

Nothing happened again for a month, and on 14 September 1969 I put up another application requesting release from the Air Force for the same reasons. Rusty Sinha called me to the Flight Commander's office, then occupied by my namesake Squadron Leader Harish "Bhaiji" Singhal. Rusty told Singhal, "Bhaiji, start this young man's flying" to which pat came the reply that I hadn't flown for months and required a dual check for which the trainer was unserviceable. I stood quietly with an expression of "I told you so". However, Rusty was not deterred and asked me if I was confident of flying solo. I promptly said yes and they put me on the programme the very next day for a solo handling sortie with late Flight Lieutenant SG Khonde as chase to watch how I perform. After Khonde confirmed that I had done all the aerobatics well, I was programmed for a close formation sortie the next day with Flight Lieutenant David D'Bras. It was with such a cynical state when I first dealt with David professionally.

I had met David earlier in the squadron and his charming wife, Colleen, in social functions in the nine months that I had spent in Hasimara by then. David was reputed to be a good flier but somewhat reticent in his briefings while expecting juniors to fly to his standards or expectations. He also had a reputation for sending people back half-way through the sortie if they did not cope. I remember much later when I was Number 4 in finger-four formation with David in the lead doing aerobatics when the Number 3 started cutting inside too much in a barrel roll and lost contact with the leader. Immediately, David sent him back to base continuing his formation aerobatics with the remaining three aircraft formation. I may highlight here that the squadrons had the luxury of surplus pilots those days and anyone who didn't perform to the desired

standards generally found himself on his way for some ground duty job or course. David was also known to have a sharp tongue and could lash people with sarcasm if required. Most people were, therefore, a little scared and avoided arguments with him. Further, David was a good shooter and owned some personal weapons due to which he was also given the pet name of "Bwana" or the "Great white Hunter" with Flying Officer SS "Garry" Grewal of 96th GD(P) as his faithful follower, gun-bearer or sidekick.

However, Colleen was very friendly and understanding of the plight of us youngsters and I recall having some long and interesting conversations with her during socials in the Mess. Through these conversations, I learnt something about social graces and etiquette from her. She was also a good dancer so we used to imitate her and pick up some good dancing moves from her. Unfortunately, David spent very little time in the squadron after we started flying together, and got more friendly, since he was keen on leaving the Air Force. David was more of a freelancer and lone wolf who wanted to do his own thing without restrictions or orders from anyone. Well, each to his own personality.

As I expected from his reputation, David gave me a laconic briefing the next morning, while sitting on the raised verandah of the squadron complex puffing on his usual charminar. All he said was, "Check in on Echo. After take-off, join up in starboard echelon, 5 minutes there, then 5 minutes in Port and 5 minutes in line astern. Thereafter, we'll see". He didn't specify what position he expected during take-off or in any of the close formation positions nor did he brief me on any techniques to maintain position. Soon, we were doing almost 3-4g turns in starboard and port echelon formation positions. With a lot of sweat and heavy breathing since I had not done close formation since training days two years before. I managed to hold onto some semblance of close formation and avoided a "return to base" call from David. After a few minutes in line astern position wherein he did a loop and a barrel roll, came a cryptic call from David saying just "400". I acknowledged but didn't really know what 400 meant nor did I have the courage to ask him since he might have sent me back to base followed by a ground assignment. Scratching my head, though under a crash helmet/bone-dome, it took me a few seconds which seemed like an eternity, before my sitting on the ground for almost nine months paid off. It came to me that I used to watch aircraft overhead doing tail chase where they seemed to be maintaining a distance of about 400 yards.

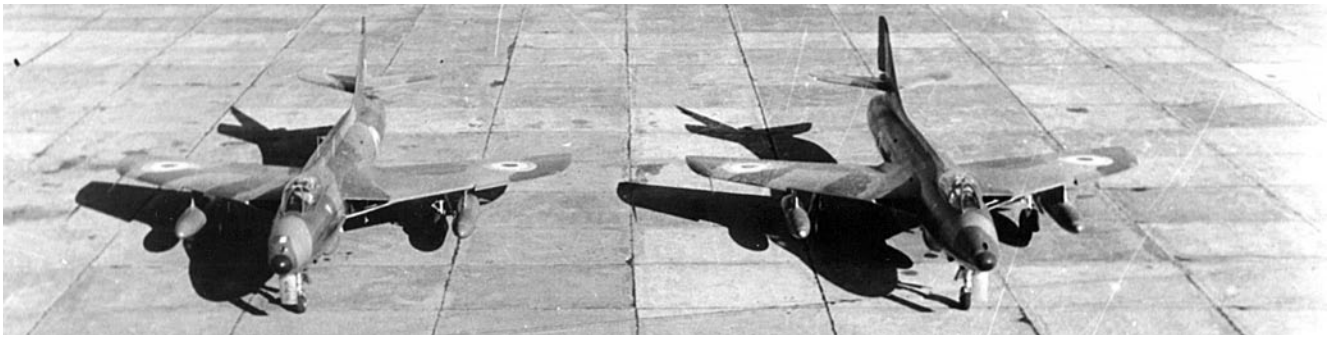
Heaving a sigh of relief, I quickly moved back to what I estimated was a distance of 400 yards and called "In Position". David now threw the aircraft around in hard turns and reversals, loops and barrel rolls and a combination of all these as hard as he could trying to throw me out of position and make me overshoot him. Once again, God was with me and with all the observations on the phase difference between the lead and the chase aircraft while sitting on the ground, somehow I managed to hold on and didn't give David a chance to send me back in shame. The next trip with David again, a couple of days later, was tactical formation with a similar cryptic briefing. After a few minutes in fighting position, David called up "1000". This time, I was prepared and quickly moved off to about 1000 yards abreast of David or what I estimated to be a 1000 yards. As soon as I called in position, David started manoeuvring for a 1 Vs 1 combat. Once again, while he tried almost every trick he knew, I didn't let him get behind me. Soon, we were barreling around each other almost in a vertically down plane, both aircraft having washed off speed, and were well below the laid-down floor level of 10,000 feet when David called off the combat by giving a call of just "Straight Ahead".

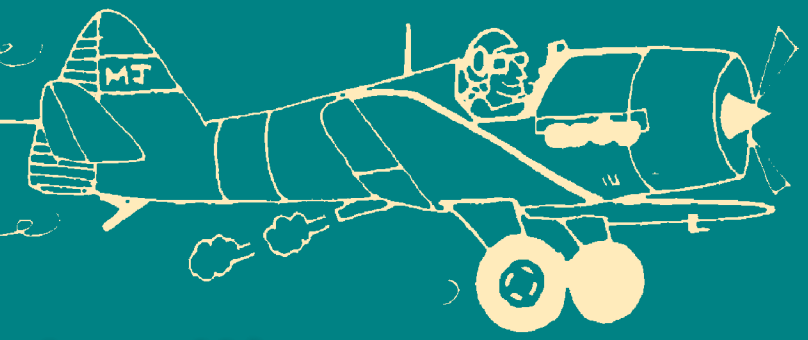
I then realised that this was David's way of assessing the capabilities of the younger pilot and choosing the ones to fly with before he shared his knowledge and really

started teaching them. Having gauged me in this manner in two sorties, David now started talking to me and started briefing me on certain tricks and manoeuvres. As just one example, he briefed me on positioning for ranging and tracking by counting till three and then asking the lead to reverse to position for an attack quickly without wasting time or fuel. He then flew a lot with me throughout my training syllabus whenever he could push himself as the leader for me on the programme and I kept picking up something or the other from him in each sortie. Thanks to such grounding and pushing by David, I slowly formulated my own theory of paths which helped me tremendously in all future tactical flying including tail chase and combat. With a scientific bent of mind due to my engineering background, I had to figure out the theory and reasoning behind every bit of flying instead of just relying purely on instinct and feel. The combination of these two approaches worked well for me. From even late Hasimara days and in the Instructors' Course in 1974, I was teaching this theory of paths to all my subordinates as well as some seniors, who were interested, so that they could improve their own tactical flying skills. For example, most of my training patter sorties in FIS as a student were spent on my instructor, Praveen Badhwar, since he was trying to change over to fighters from transports. My only regret is that I never wrote this theory down and circulate it all over the Air Force. An excuse I make is my frequent moves in the initial years where I was doing an average of just 13 months in a squadron/unit till I became a CO myself of the new MiG-29 squadron. Even in those 13 months, I used to be on detachments or courses more than half the times whereby even 28 Squadron, which I commanded for almost two years, gave me a calendar as a farewell gift marking the days when I was in Poona, the home base, as "back on temporary duty". But, honestly, I admit all that is merely an excuse.

Such a hard grind, followed by nuggets of wisdom, from David coupled with Babla Senapati's technique (covered in the last issue), helped me develop as a fighter pilot. At the cost of being called immodest, I would like to mention that it was due to such training that I did not let anyone get behind me in 1 Vs 1 throughout my career except for one occasion. I have no shame in admitting that on that one occasion against Flt Lt Ambekar in MiG-29s in Poona when I was the AOC, my helmet was borrowed and a little loose. This slipped over my eyes as soon as we started combat and I pulled 'g" which made me lose contact with him almost immediately. In the second situation, "God was my Co-pilot", as inscribed on my helmets from the day I started flying in the Air Force, and I could retrieve the situation and reputation back to one-all. Some folks even pulled up into the sun to try and shake me off their tail when they found themselves at a disadvantageous position but, as learnt from David, I would just move slightly to one side and keep the adversary aircraft out of the sun and in contact till he lost speed and started downward when I would cut in and close the distance to take a shot. The theory of paths also later helped me tremendously in keeping track of the relative position of own and adversary aircraft in group combat thereby arriving at a favourable outcome in combat and during regroups. As Flight Commander of 1 Squadron and later, CO of 28 Squadron, I tried to pass all this on to my subordinates.

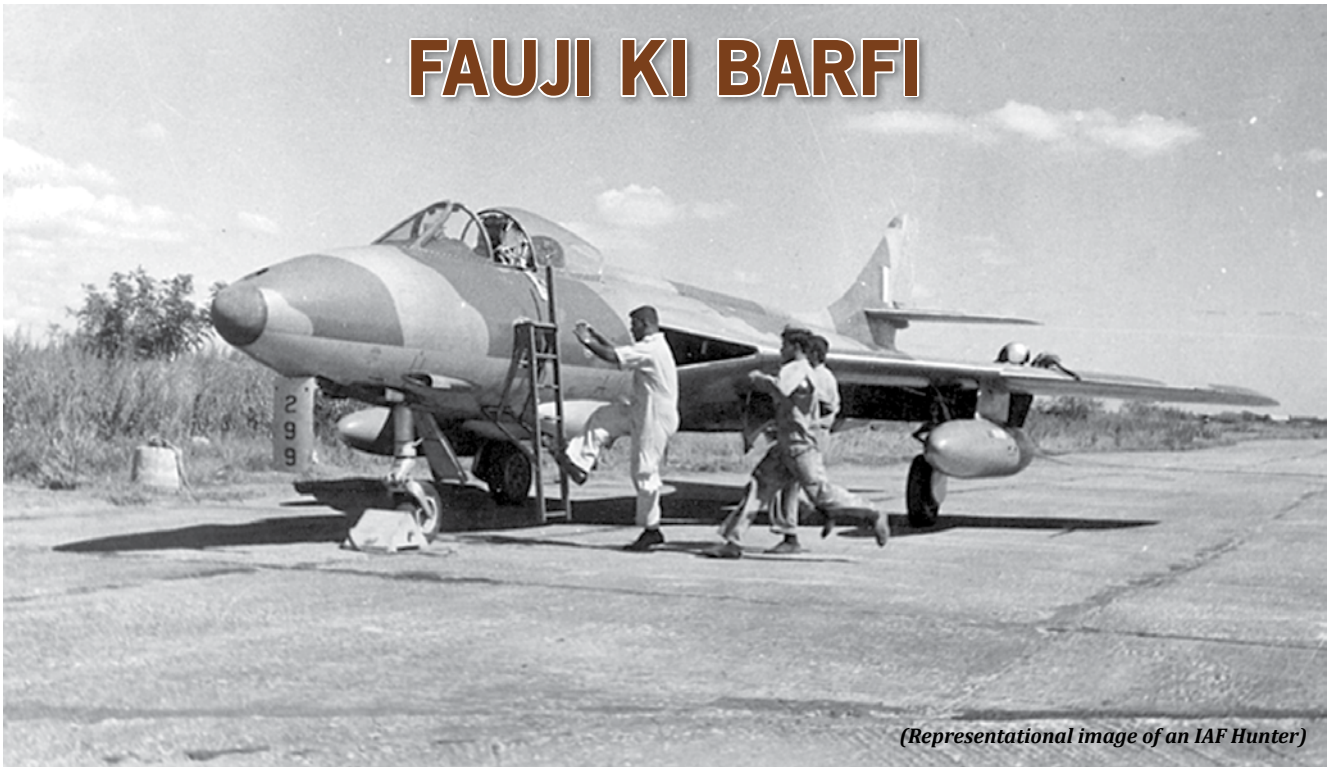
(All photos: IAF. For representational purposes only)





Air Vice Marshal (R) Cecil Parker and his.....

FAUJI KI BARFI



(Representational image of an IAF Hunter)

One of the fallouts from the Swarnim Vijay Varsh celebrations last year was the large number of little known stories from the 1971 Indo–Pak war which stimulated the memories of the rapidly diminishing number of surviving participants. In my 90th year I find that short term memories sometimes fail but long term ones are still reasonably clear. One such unknown story describes a simple gesture of spontaneous jointmanship at the operational level. During that war I was in command of a squadron, then equipped with Hunter Mk 56A aircraft and based in Pathankot. Our primary task was counter air operations deep inside enemy territory (airfields/radar units/oil refineries/dams) for the first five days after which our role was changed to CAS (Close Air Support) to our land forces in Punjab and J & K. On 10 Dec 71 an urgent request for CAS came in from a bde (brigade) in the Chamb area where its lead elements were held up by a well dug-in enemy gun position, up-slope in a ravine and which dominated the only road to a bridge. Our army GLO (Ground Liason Officer) briefed us on the situation, terrain, location and urgent requirement to neutralise this gun position holding up our advance on that axis.

Mission 527 was led by me and I took with me one of our younger pilots as my wingman. In addition to the 4 x 30mm guns integral to the aircraft, we each carried 2 x 68mm RP (rocket pods) externally. Within an hour of receiving the request we were airborne and soon in contact with the FAC (Forward Air Controller) with the bde who directed us correctly to the gun position. The terrain did not permit conventional RP attacks so I decided to improvise and fire all 16 rockets in salvo from close-in and just above the camouflaged enemy position. Probably not wanting to give away its position, it refrained from any defensive fire. My wingman capped the area above for any enemy air threat while I put in my attack which he replicated while I gave him top cover. The target was a mass of smoke, dust and debris from which we could see some figures running downhill towards their vehicles which we then shot up with our front guns. As we left our FAC called out 'Good shooting Sir' and during our debrief I complimented my wingman for coping very well.

Later that evening, just prior to the nightly 'blackout', I received an unexpected visit at my residence from the army GLO who arrived carrying two gift wrapped sweet

(The author of this piece and series in the Vayu magazine is busy typing away to meet the next deadline!)

boxes. He had received a message from the BM (Brigade Major) saying that thanks to the effective air support provided, they were on the move and requested that *'dono pilot ko barfi khilana'!* I conveyed our thanks and requested him to kindly hand over the wingman's box directly to him in the Mess. Most evenings/nights I made a visit to our loop dispersal where our night shift of technicians carried out repair and service of aircraft inside the covered blast pens. Our 'Chiefy' would brief me on the number of aircraft we could plan on for the next day; I handed over my box of *barfi* to him for the airmen and explained that it was a token of appreciation from the Army! I do not know what happened to the other box, but it is unlikely to have survived very long either in the Mess or the crew room!

VISUAL HISTORY

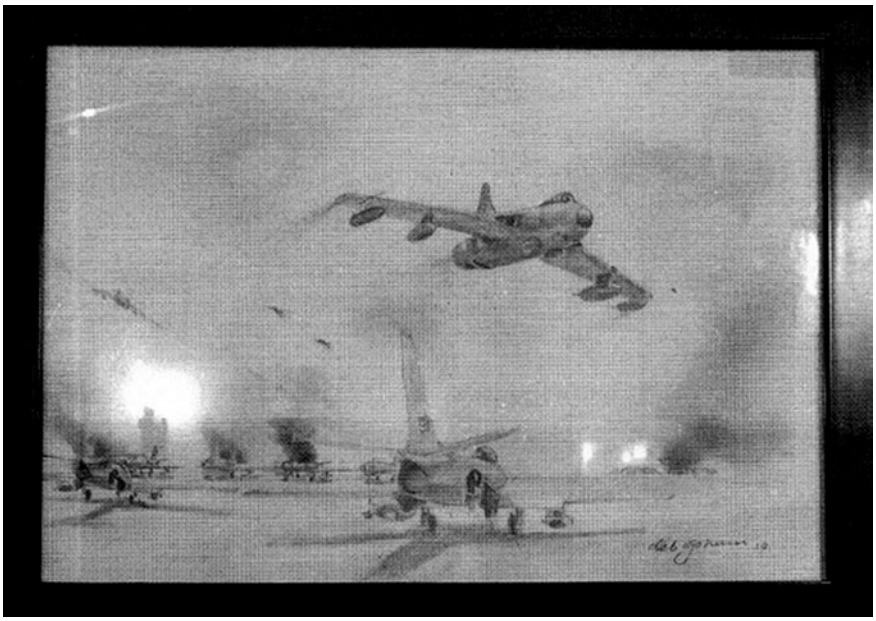
During the 1971 Indo-Pak war, No 20 Squadron, equipped with Hunter Mk 56A aircraft, was based at Pathankot. Among its many counter air targets was the PAF air base at Murid. This airfield was attacked by No. 20 Squadron Hunters on 4, 7 and 8 Dec'71 and took a collective toll of nine F-86 Sabre aircraft destroyed/damaged on ground. On Page 82 of his book 'In the Ring and Standing' (published in 2018), Air Cmde Kaiser Tufail (Retd) of the PAF confirms this loss adding that 'the base took the worst beating of the war on 8 Dec 71 when seven Sabres were destroyed/damaged along with many drop tanks'. This was a most significant event in the air war for our air force and No. 20 Squadron.

The successful raid(s) on Murid inspired Gp Capt Deb Gohain (Retd), himself a fighter pilot with 30 years of service, to get in touch with this writer in Hyderabad from his home in Gauhati. Deb is also a gifted artist whom I have never met but whose oil paintings on IAF activities I have seen. He was keen to depict the Hunter raids on Murid on canvas. Since I had been the CO of the squadron during the war and had led one of the strikes, he needed some information on aircraft configuration and layout of Murid airfield. I was happy to share whatever information I could remember.

In November 2021, a truly realistic oil painting (packaged safely within a cylinder) was hand delivered to my home. It accurately depicted four Hunters pressing home their gun strikes successfully through defensive ground fire. It was colourful visual history and I was privileged to receive it. However I genuinely felt that its proper and rightful home should be in No. 20 Squadron and not in the possession of an individual. I shared these thoughts with Deb who was very understanding and supported my request to the current CO of No. 20 Squadron to kindly arrange for its collection. On 2 Dec'21 I received telephonic confirmation that the painting had reached the Squadron. Since then, neither the donor artist or this writer have heard anything further.

Unknown to me Deb was working on another idea. He ascertained my postal address and last month I was surprised to receive another large professionally packaged parcel by courier. Inside was a striking (pun intended) black and white replica of the very same painting. In his covering letter he explained that all his oil paintings are based upon a pencil sketch and requested me to accept it as a personal gift. I was greatly touched by this gesture and his thoughtfulness. I am no connoisseur of art but visual realism is equally effective in the black and white pencil sketch; see picture. Duly framed it is now another valued addition to the memories of my years in the IAF and in particular those with No. 20 Squadron.

History is a link from the past to the present; it serves a purpose and exists in many forms. Creative art that accurately depicts significant air force events, is visual history. Such history should be preserved and displayed wherever it is appropriate and facilities to do so exist. Perhaps our air force may now like to think in terms of a professional art gallery in our Air Force Museum.



IAF Hunters raid PAF airbase Murid: December 1971

25 Years Back

From Vayu Aerospace Review Issue III/1997

Countdown to Su-30 induction

Russian engineers have been busy at the Lohegaon Air Force base (Poona) getting ready the first batch of Sukhoi-30s for test flights leading to induction of the aircraft into Indian Air Force service. The engineers had arrived at Lohegaon along with the first Su-30s in "knocked-down" condition in March followed by one more aircraft in April. It is expected that the "formal" induction of the Su-30s into the IAF would be sometime in early June.

Dornier HAL Joint Venture

According to its Chairman, RN Sharma, Hindustan Aeronautics Ltd (HAL) will float a joint venture with the German Fairchild-Dornier Company for servicing and repairs of Dornier 228 aircraft worldwide. A feasibility study has already been undertaken to go into various aspects of the joint venture. HAL has produced 67 Dornier 228 aircraft so far and is fully geared to make the Joint Venture a success. Meanwhile, HAL has just executed a $2 million order for Boeing through supply of emergency doors for the Boeing 757 airliners and also launched a digitalisation programme for the 747. Besides, HAL has reached an agreement with Boeing for executing orders worth $20 million which will include spares and components for Boeing 737 and 747 aircraft.

ISRO plans 17 missions

The Indian Space Research Organisation envisages a busy space programme for the Ninth Plan period, beginning this year, with as many as 17 missions being planned till 2002. Besides the last two satellites of the second generation series Insat 2-D, scheduled for launch from Kourou on 29 May and Insat 2-E, the ISRO has plans to launch four satellites of the third generation Insat series during the current five-year plan period. Two of them will utilise procured launches and the remaining two the second generation Geo Synchronous Launch Vehicles (GSLV).

RAF C-130Ks offered to IAF

Lockheed Martin have offered to supply 25 former RAF C-130K transports to fulfill various roles with the Indian Air Force. The C-130Ks are to be phased out from RAF services and replaced by the new C-130Js and the US company is actively looking at potential markets, both military and civil. The IAF, which presently operates nearly 100 Antonov An-32s and a dozen Ilyushin II-76s, however are seeking an aircraft of the "C-130/An-12" size to meet specialist requirements which could include aerial refueling and AEW roles.

Japanese fighter squadrons

Resulting from delays in production of the Mitsubishi F-2 close air support fighter, Japan's air arm is to restructure its fighter force, and the JASDF has formed another squadron, (the 306th), part of the 6th Wing at Komatsu Air Base in central Japan, with McDonnell Douglas/Mitsubishi F-15J fighters. Meanwhile, the 8th Air Squadron of the 3rd Air Wing at Misawa air base will convert from Mitsubishi F-1s to McDonnell Douglas/Mitsubishi F-4EJs. The F-15J force was intended to remain at seven squadrons but was boosted by another to fill the gap created by the shift of F-4s at Misawa.

Bell 206L-4 evaluated by Pakistan

Confirming that the Pakistan Army is evaluating options for meeting its helicopter commitments in the Siachen area, the following release from Bell Helicopters is pertinent: A high altitude demonstration flight in the Himalayas late last year turned out to be an opportunity for the Bell 206L-4 LongRanger to test its mettle in some of the most hazardous flying conditions in the world. Equipped with Bell's new advanced tail rotor system and wide chord main rotor blades, the LongRanger was in Pakistan demonstrating its high altitude capability to the Pakistan Army.

The Hawk 100 for NATO training

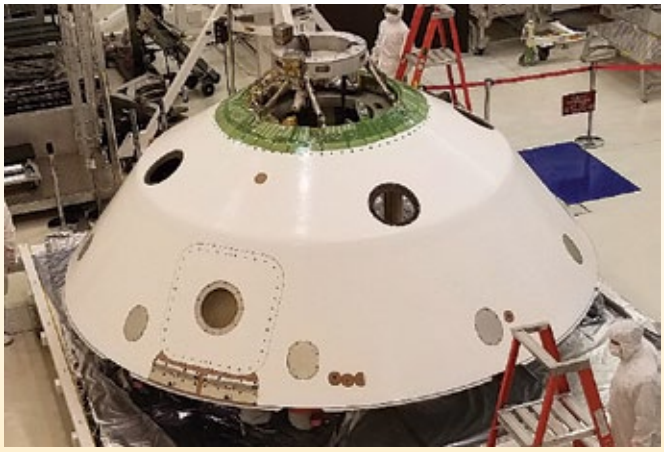
British Aerospace's Hawk will be the standard advanced jet and fighter lead-in trainer for the NATO Flying Training in Canada (NFTC) programme. British Aerospace Military Aircraft will supply the Hawk 100 training aircraft for the programme, which will commence in the year 2000 for the Air Forces in Canada and Europe. The Hawk 100 was earlier also selected by the Australian Defence Force in November 1996 and over 775 numbers of Hawk variants have been ordered by 17 air arms around the world.

647 NH90s planned

The number of NH90s due ultimately to replace ageing fleets of Puma, Super Frelon, Lynx, Bell UH1D, 212, 412, Agusta and Sea King helicopters in the French, German, Italian and Dutch armies and air forces has been reduced from 726 to 647 machines. France (160, previously 220) and Germany (243 instead of 272) have both had to contend with slashed defence spending. The Netherlands, on the other hand, is maintaining its 20 naval versions, while Italy has increased her total from 214 to 224 machines.

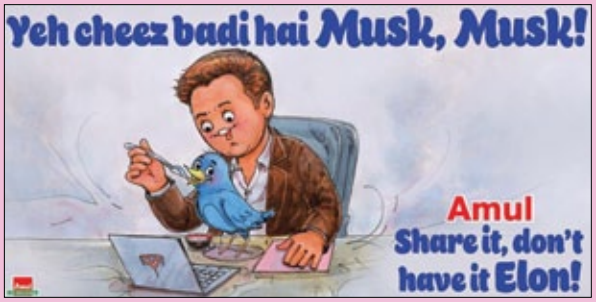
Tale Spin

Incredible. An unmanned helicopter taking photos of debris—all taking place on another planet (Mars)!



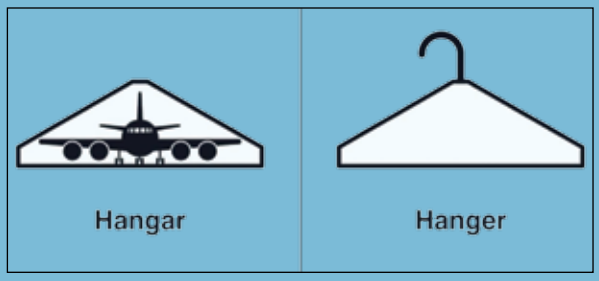
How it started and how it ended. NASA's Mars helicopter on 27 April 2022 spotted the parachute and equipment that helped Perseverance rover land. You can see the protective backshell and massive dusty parachute. Absolutely surreal to see an aerial perspective of debris on Mars. These are historic photos.

Topical as ever: Amul butter ad in India



Billionaire Elon Musk buys Twitter for $44 billion!

Can we end this spelling debate please?



Above are the correct spellings. Similarly it is "aircraft" and never "aircrafts"!

Bridges of Friendship or competition checkout?

Arrival at Airbus headquarters in Toulouse, France on 28 April 2022 morning of a Boeing 767 of Delta Air Lines from Atlanta, USA carrying employees who came to pick up a brand new Airbus A330Neo which was waiting at the delivery centre. (Images: @Frenchpainter)

Afterburner

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