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Secretary, Defence Production
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General Bipin Rawat
Chief of Defence Staff

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IDEX Provides a Fillip to Defence Industry in MENA Region

As Abu Dhabi gets ready to launch the latest edition of International Defence Exhibition and Conference (IDEX), which is the biggest defence event in the Middle East and North Africa (MENA) region, the companies across the globe eye up to seize an opportunity for getting their business back in line in the COVID era.

IDEX attracts a huge number of international decision makers in the defence industry, armed forces and senior military personnel around the world. Strong representation from GCC and the wider international community make IDEX the prime platform to showcase their products and technologies.

India aims big at the expo to highlight the country's weapon systems and platforms and explore new spheres in defence exports. The exhibitors, including leading DPSUs and private players, will participate in the event in a big way to brand India as a potential exporter of defence products for tri-services. The delegation aims to project India as a potential player in the defence industry in Asia and forge a new business alliance in the Middle East region.

With the vision of Atma Nirbhar Bharat (self-reliance) in defence manufacture and promoting the arms and spare exports in the sector, Indian delegation aims to bolster Prime Minister Narendra Modi's vision of making India a defence manufacturing hub. Moreover, the expo happens in the background of the Indian cabinet having approved delegation of powers under Make-1 of Defence Acquisition Procedure 2020. This will greatly ease design and prototype development by Indian industry for defence equipment.

In the wake of the recent Israel-UAE normalization deal, Israeli companies will participate and exhibit at IDEX for the first time in history and the Israel Defence Exhibition (ISDEF) will be the exclusive promoter of IDEX for the Israeli pavilion.

As Media Partners, Aeromag and Sailors & Warriors wish success to all the exhibitors and business visitors of the show.

Sunny Jerome
Managing Editor

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IDEX 2021 : India Showcases its Prowess in Defence Exports

The Indian delegation, which consists of a slew of leading Defence Public Sector Undertakings (DPSUs) and thriving private defence and aerospace manufacturers, gets another international platform to showcase their manufacturing prowess at IDEX 2021. DPSUs Bharat Dynamics Limited (BDL), Defence Research and Development Organisation (DRDO), Garden Reach Shipbuilder and Engineers Ltd (GRSE), Mazagon Dock Shipbuilders Ltd (MDL) and Ordnance Factory Board (OFB) will participate. In order to highlight India's weapon systems and platforms and to provide fillip to overall defence export potential, the Indian exhibitors will participate in the event in a big way, carrying forward the Prime Minister Narendra Modi's vision of making the country a leading defence and aerospace manufacture hub in the world.

Raj Kumar
Secretary, Defence Production
Ministry of Defence

As Abu Dhabi launches the latest edition of world's one of the most strategically important tri-service exhibitions International Defence Exhibition and Conference (Idex) from 21-25 February, India's defence manufacturers are all set to showcase the country's defence export prowess and explore new business markets. The Indian delegation, which consists of a slew of leading Defence Public Sector Undertakings (DPSUs) and thriving private defence and aerospace manufacturers, gets another international platform to showcase their manufacturing prowess.

In order to highlight India's weapon systems and platforms and to provide fillip to overall defence export potential, the Indian exhibitors will participate in the event in a big way. Carrying forward the Prime Minister Narendra Modi's vision of making the country a leading defence and aerospace manufacture hub in the world, the representatives will brand India as an exporter of potential defence systems and components for all three services with their participation and high-level B2B meetings.

The Indian pavilion will bolster the vision of Atma Nirbhar Bharat (self-reliance) in defence manufacture and promote the arms and spare exports in the sector. The biennial show, IDEX, will be held at the Abu Dhabi National Exhibition Centre (ADNEC), which is centrally located in Abu Dhabi, the capital of the United Arab Emirates.

This year, IDEX will witness the participation of DPSUs Bharat Dynamics Limited (BDL), Defence Research and Development Organisation (DRDO), Garden Reach Shipbuilder and Engineers Ltd (GRSE), Mazagon Dock Shipbuilders Ltd (MDL) and Ordnance Factory Board (OFB). The Indian delegation will also include the General Bipin Rawat, Chief of the Defence Staff, Raj Kumar, Secretary, Department of Defence Production, Rear Admiral V K Saxena, IN (Retd.), Chairman and Managing Director, GRSE, among other dignitaries.

With the participation of GRSE and MDL, India will present its capabilities in naval designing and shipbuilding being one of the few countries of the world, which is capable of designing a naval vessel from scratch to finish. BDL, OFB and DRDO will

General Bipin Rawat
Chief of Defence Staff

showcase India's abilities in making lethal missiles, artillery guns, arms, armoured vehicles and other defence products and technologies.

The delegation aims to project India as potential player in the defence industry in Asia and forge new business alliance in the Middle East region. During his visit to UAE in December, Chief of Army Staff General MM Naravane has met Commander of the UAE's Land Forces and Staff Major General Saleh Mohammed Saleh Al Ameri and discussed key issues of mutual interest and defence cooperation.

With a bigger presence at IDEX, India aims to further strengthen bilateral defence cooperation with UAE and it will be a reflection of India's growing strategic

ties, which are expected to open up new avenues for cooperation in the defence and security spheres. The harmonious relationship between the UAE and India will be further cemented and cooperation on bilateral, regional and multilateral fronts will be enhanced in the post-Covid era.

IDEX is the only international defence exhibition and conference in the Middle East and North Africa (MENA) region demonstrating the latest technology across land, sea and air sectors of defence. It is a unique platform to establish and strengthen relationships with government departments, businesses and armed forces throughout the region.

IDEX is held under the patronage of His Highness Sheikh Khalifa Bin Zayed Al Nahyan, President of the UAE and Supreme Commander of the UAE Armed Forces and is organised by the Capital Events in association and with the full support of the UAE Armed Forces. All IDEX badge holders are exempted from the 10-day quarantine procedure on their arrival into Abu Dhabi. This step has been taken to facilitate the arrival of international delegations from all over the world.

IDEX continues to offer exhibiting companies the opportunity to demonstrate equipment and crafts. Daily choreographed displays will take place on the water and on the purpose-built demonstration track. In addition, exhibiting companies are invited to host private demonstrations of their vehicles and crafts.

NAVDEX, the Maritime Security Area features local and international exhibitors who specialise in naval, maritime and coastal security technology, equipment and crafts. Located on the dock edge, NAVDEX also features on-water exhibits, daily demonstrations and visiting navy vessels.

For over 27 years, the successes of both the IDEX and NAVDEX exhibitions have added to the UAE's record of international achievements.

CS Vishwakarma
DGOF & Chairman of OFB

Rear Admiral V K Saxena, IN (Retd.)
CMD, GRSE

Cmde Siddharth Mishra (Retd)
CMD, BDL

VAdm Narayan Prasad
CMD, MDL

Invincible Tactical Advantage

BRAHMOS, the deadliest supersonic cruise missile in the world that can be integrated on almost all platforms and capable of operating from across the spectrum of war, has great potential to become India's major weapon export in the coming decades, says Dr. Sudhir Kumar Mishra, Distinguished Scientist & Director General (BrahMos), DRDO, Ministry of Defence, CEO & MD BRAHMOS Aerospace, in an exclusive interview with Aeromag. Excerpts from the interview:

Dr. Sudhir Kumar Mishra
Distinguished Scientist & Director General (BrahMos), DRDO, Ministry of Defence
CEO & MD, BRAHMOS Aerospace

In the context of IDEX, in Abu Dhabi, shall we start off by seeking your perspectives on the scope and intent of BrahMos Aerospace garnering a big chunk of missile export market in the Arabian Gulf, Middle East and South East Asian countries? How do you respond to the reports about BrahMos being sought after by the Philippines and some other nations in the ASEAN region, as well as some South American, East European and African countries?

BRAHMOS supersonic cruise missile is a weapon of strategic importance and Government of India would take appropriate decision to export this missile system to any country as dictated by its diplomatic and strategic policies. I don't want to divulge anything on the talks and discussions but would like to say that we have the requisite production capability to handle any such export demands and requirements as and when they arise. As a high technology defence product, BRAHMOS has great potential of becoming India's major weapon export in the coming decades giving the country a share of the arms business.

What makes BrahMos, the world's fastest and deadliest supersonic cruise missile, so unique and distinctly a winner in the global aerospace and defence market in terms of its velocity, flight range, seeker range, kinetic energy, stealth technology and guidance system, and strike capability?

BRAHMOS is the deadliest cruise missile in the world today. The entire world is aware of the precision strike capability of this uniquely powerful weapon. BRAHMOS is a stealthy weapon which cannot be intercepted by any modern air defence system, however powerful that may be. The high versatile weapon system has the capability to operate from across the spectrum of war and decisively influence its outcome. With the successful induction of BRAHMOS in its armed forces, India has gained an invincible tactical advantage over its potential adversaries.

With its long range annihilating power, BrahMos is widely acclaimed for its seamless integration and configuration for multiple platforms – ship, fighter jet, submarine or a mobile land launcher. How do you propose to widen its deployability and operationality for various regiments and forces?

All the frontline warships of Indian Navy are armed with BRAHMOS, providing a significant defence cover and safeguarding the international borders. The Indian Army too has deployed the mobile, land-attack BRAHMOS variant which can strike at designated enemy targets and installations with pin-point accuracy. BRAHMOS has also added teeth to India's air and maritime dominance in the Indian Ocean Region with the induction of Su-30MKI equipped with supersonic cruise missile by the IAF's No. 222 Squadron ('The Tigersharks') in Southern India. This will ensure that a major part of the world is covered by its "stand-off" attack capability. BRAHMOS can strike targets 300kms away with accuracy of less than five meter. With this, BRAHMOS is now integrated on almost all the platforms. On land, we intend to further widen the scope of deployability.

In just over two decades – 22 years to be exact – how BrahMos Aerospace, the Joint Venture between India's Defence Research and Development Organisation and the Russian Military Industrial Consortium NPO Mashinostroyenia, has changed the dynamics of warfare and the entire defence manufacturing ecosystem in India?

The BrahMos Joint Venture (JV) bears the finest testimony of India-Russia strategic partnership. In fact, it is this

uninterrupted flow of energy and brilliant synergy between both the nations that has made BRAHMOS truly world-class. The JV, since its inception in 1998, has been "technology sharing" programme wherein both the partners have brought in their respective technological expertise and knowledge base to design, develop and field such a powerful weapon which is unparalleled in the world. This has definitely led to mutual learning and understanding and further widened the scope to work together on newer, more advanced BRAHMOS versions and achieve new technological breakthroughs.

The JV has also successfully set up a consortium of defence industries from India and Russia for producing various systems & sub-systems for the world-class BRAHMOS weapon complex. It has brought together number of competent defence industries both public and private and various R&D laboratories from the partnering countries in developing and producing different sub-systems for the universal missile system which has rendered a unique strength to the Indian Armed Forces. The entire team of BrahMos, including the consortium of Indian and Russian industries, R&D labs and academic institutions of both the countries, have made significant contributions in design, development, manufacturing, integration, and product support of the missile system. More than 20,000 Specialists, Engineers & Technicians in over 200 large and medium industries are currently associated with BrahMos as a great strength and force multiplier.

Inducted first in 2005 in the Indian Navy as the Ship-based Weapon Complex System, then evolving as a land-based system comprising mobile autonomous launchers, a canisterised missile capable of being launched from a submerged platform underwater and finally making history as the heaviest weapon to be deployed on India's frontline fighter jet, Sukhoi-30 MK1 in a successful flight test in 2017. Looking back, what do you think was the most crucial technological breakthrough in this incredible transformation? What is the current status of deployment in the Indian Armed Forces?

We have developed many variants of this formidable weapon system BRAHMOS which was initially conceived as an anti-ship missile. The first successful launch was conducted in June 2001 that is within three years of JV formation. The highly versatile BRAHMOS has been successfully tested in land-to-land, land-to-sea, sea-to-land, sea-to-sea, and most recently in air-to-sea and air-to-land configurations. The missile can be fired either from static, mobile platforms (land & sea) or fighter aircraft, in solo or salvo mode. Indian Army is the only Land Force in the world to have supersonic weapon with surgical strike potentiality. The mobile land-based configuration of BRAHMOS has achieved several advancements over the years in the form of Block I, Block II and Block III variants. The naval version of the missile has been modified and flight-tested in different configurations, proving its mettle in each scenario successfully. The missile system has been inducted in top Indian Navy warships. The missile was also successfully flight-tested from the Indian Air Force's

(IAF) frontline fighter aircraft Su-30MKI against a sea based target. BRAHMOS has now been successfully inducted with the IAF's Su-30MKI.

More than a Transfer of Technology collaboration, BrahMos missile stands out as a unique outcome from a joint design, development, production, integration and product support. The indigenous Booster and Airframe Section recently flight tested successfully, is a striking testimony on the vital enhancement drive for indigenous content. Where do you go from here?

With BRAHMOS missile, the indigenous content in the formidable weapon has reached a high value, thus bolstering India's defence indigenisation and the flagship "Make in India" programme of Government of India. Today, the Ground support system of BRAHMOS which includes the Mobile Autonomous Launcher, Command Post, Ancillary Vehicles and Communications Systems are all made in India. We have successfully indigenised major sub-systems such as booster, nose cap, canister, fuel management system, Air Frame and other major non-metallic airframe components taking the Indian contribution to more than seventy percent. All launcher systems for the weapon are also being manufactured domestically by Indian industries. This achievement has given boost to BrahMos's "Atmanirbhar Bharat" pledge. What we are now focussing on along with Russian partners is to manufacture and produce more in India using technology that is available in Russia in order to upgrade our equipment, to manufacture new equipment and to build upon the success of the past.

Now that you are venturing into Hypersonic world, what are the great challenges that you encounter working on a new engineering paradigm, new aerodynamics, new materials and new configuration? In the niche, elite technological exclusivity of Hypersonics, how do you fare internationally?

The hypersonic BRAHMOS-II (K) is envisioned to become the fastest cruise missile system in the world by flying at a top speed of 7-8 Mach (seven to eight times the speed of sound). The hypersonic missile will definitely provide an advantage to the Indian armed forces in future warfare. The challenges are many in developing such a break-through technology. NPOM has already started ground work for the hypersonic variant and hope to hit the sky by 2028. DRDO, from its end has already test-fired Hypersonic Technology Demonstrator Vehicle (HSTDV), precursor for the development of a hypersonic cruise missile system. ■

'DRDO Ably Responds to Futuristic Warfare Needs'

Dr G Satheesh Reddy,
Secretary DDR&D & Chairman DRDO

DRDO has been continuously and consistently putting its best efforts in realizing the advanced defence systems and technologies for Indian Armed Forces. DRDO will be responding ably to the future war-fighting requirements of the tri-services with advanced technologies," says Dr. G Satheesh Reddy, Secretary, Department of Defence R&D and Chairman DRDO. In an interview with Aeromag, he talks about the organisations latest operations diversified focus on futuristic technologies.

Over the last six decades DRDO has been the backbone of India's defence research and development. What are your thoughts on DRDO's success in achieving its aims over these years?

DRDO has been continuously and consistently putting its best efforts in realizing the advanced defence systems and technologies for Indian Armed Forces. Efforts put by DRDO over last six decades resulted in induction of many products into the service's and many are on the anvil. DRDO is keeping abreast of the scientific development, advanced technologies in defence arena and is working on new futuristic products.

Despite the challenges posed by the pandemic, 2020 has been a fruitful year for DRDO with many successful testing of weapons and technologies. Could you give an overview of major achievements recently?

Start of year 2020 saw inauguration of five DRDO Young Scientists Laboratories (DYSLs) by Prime Minister. Naval version of Light Combat Aircraft (LCA) did a successful arrested landing onboard INS Vikramaditya on 11th January 2020.

DRDO scientists have worked relentlessly during the COVID-19 Pandemic not only to develop products and technologies for combating COVID but have been keeping a pace with their project deadlines. DRDO undertook product development on war footing to fight COVID-19 pandemic and developed 50 technologies and more than 75 products which include PPEs, Hand Sanitizer, UV Blaster, Germi Klean and the like, which have direct utilization to combat COVID 19. DRDO has also developed three COVID hospitals in a very short span of time. Flight Testing of Hypersonic Technology Demonstrator Vehicle (HSTDV) and Quantum Communication are significant technology demonstrations this year. The work picked up after lockdown and a series of weapon trials carried out. Some of the major achievements in the year 2020 are trials of Air Defence Fire Control Radar (ADFCR) 'Atulya', Advanced Light Weight Torpedo (ALWT), 3rd Generation Helicopter Launch Anti-Tank Guided Missile (Dhruvastra). DRDO identified 108 Systems and Subsystems for industry to design, develop and manufacture towards achieving "Atmanirbhar Bharat". Active Electronically Scanned Array Radar (AESAR) 'Uttam' completed 100 hours of testing.

ABHYAS High-speed Expendable Aerial Target (HEAT), Extended range Pinaka Weapon System, Supersonic Missile Assisted Release of Torpedo (SMART) and indigenous development of Anti-Radiation Missile (RUDRAM) flight tests were successful. Quick Reaction Surface to Air Missile (QRSAM) System has achieved a major milestone by a direct hit onto a Banshee Pilotless target aircraft at medium range & medium altitude. MRSAM had the maiden successful test flight.

Other major systems which have completed the testing include Fire Detection and Suppression System (FDSS) for passenger buses and 5.56 x 30 mm Joint Venture Protective Carbine (JVPC). Hypersonic Wind Tunnel a major asset for advanced aerospace design validation capabilities was inaugurated by RM this year.

DRDO has played a pivotal role in enhancing India's missile capabilities and this year there were major milestones in terms of A-SAT,

ATGM, RUDRAM, Pinaka Weapon System etc. Could you elaborate on DRDO's projects on missiles?

ASAT was test proven in 2019 and it was a text book hit of the in-orbit satellite in the space. This year major milestones were achieved in the Anti-Tank missile segment. Laser guided anti-tank missile was successfully tested in September. The missile employs a tandem HEAT warhead to defeat Explosive Reactive Armour (ERA) protected armoured vehicles. The trial evaluation was done from the gun of MBT Arjun. Nag user trials were completed in October this year. Man portable ATGM is getting ready for induction.

QRSAM is the first track on the move and fire missile. The developmental trials of the weapon system are successfully completed and the weapon system is expected to be ready for induction.

The RUDRAM is first indigenous anti-radiation missile of the country for Indian Air Force and is integrated on SU-30 MKI fighter aircraft as the launch platform. Development of Enhanced Pinaka rocket system was taken up to achieve longer range performance compared to earlier design. The first set of trials was completed in November this year.

In September, DRDO has successfully demonstrated the hypersonic air-breathing scramjet technology with the flight test of Hypersonic Technology Demonstration Vehicle (HSTDV). How crucial is this technology and what are its applications?

The HSDTV test in October this year has put India in a select league of nations who possess hypersonic scramjet proportion technology. After US, Russia and China, India is the fourth country who has demonstrated this capability. Hypersonic means the speed of the vehicle is more than 5 Mach and there are many crucial technologies associated with this. Many critical technologies such as aerodynamic configuration for hypersonic maneuvers, use of scramjet propulsion for ignition and sustained combustion at hypersonic flow, thermo-structural characterization of high temperature materials, separation mechanism at hypersonic velocities etc. are proven.

Hypersonic technology offers the ability to fly at low altitude instead of ballistic trajectory, which helps avoid detection at farther ranges by earth-based sensors. Maneuverability at low altitudes at that speed adds unpredictability which is major advantage. The applications of hypersonic technology include Hypersonic Glide Vehicles and Hypersonic Cruise Missiles. Hypersonic Missiles can inflict serious damage on to time critical enemy targets.

Enhancing India's UAV capabilities is one of the major objectives of DRDO and Rustom-2 medium altitude long endurance indigenous prototype drone was flight tested in October. What are the updates of various drone projects by DRDO?

DRDO has envisaged the need for a dedicated test range for testing and evaluation range to handle the fast-growing requirements of UAVs. Aeronautical Test range has been established at Chitradurga, which is the only range for flight testing of UAVs in the country.

Rustom I, a Medium altitude long endurance (MALE) unmanned aerial vehicle was conceived as test bed for technology evaluation for Rustom -2 project. Rustom I itself can be used as a UAV which can be operated from runways. It can operate at altitudes upto 20,000 feet and has endurance of 12-15 hrs with range upto 250 km and payload capacity of 75 kg; Rustom 2 is a MALE UAV with operating altitude of upto 30,000 feet and endurance upto 24 hrs with operating range of 1000 km (with SATCOM). The development trials are likely to be completed by July 2021.Abhyas is an expendable

Aerial Target developed for practice firing by Armed forces, which has enormous potential.

India is actively proceeding with the modernisation of the armed forces and how does DRDO support this? What are the challenges ahead for boosting the combat readiness of armed forces?

With changing times, the old systems are required to be replaced with newer ones. Technologies for defence are changing and so are their applications in the emerging defence scenarios. The newer and faster systems are to be deployed. Modernization of Armed Forces is a very involved job and a lot of effort from all stakeholders is required to be carried out in a synergistic mode. In this massive work, DRDO is geared up to put efforts for enhancing the overall capacity of defence development in the country. DRDO has increased its design and development capability for faster design and development. DRDO is fully equipped with quick design and development of missiles, radars, sonars and EW systems. With the available expertise, large systems like tanks and aircrafts can also be designed on shorter timelines. DRDO has also laid down many policies to cut down the delays in technology transfer to industry for the production of systems. The initiatives like Development cum Production Partners will further help industry to work concurrently with development so that the know how is transferred seamlessly for life cycle support of the developed system.

What are your visions and priorities for DRDO over the next two years? What are the objectives in bolstering national security?

DRDO will take up system development in the emerging dimensions of warfare and in the field of artificial intelligence, quantum technology, photonics, cyber technology and the like. DRDO scientists are working in niche defence technology areas for building next generation systems, weapons and platforms and have chartered out paths to harness these technologies. Scientists are collaborating extensively with academia in the blue sky research and with industry to develop defence systems in the shortest time frame. A number of activities pertaining to various systems like AEW&C, AMCA, Guided Pinaka, Radar systems, Missile systems, Underwater unmanned systems are planned for 2021.There are many other defence technologies and systems DRDO has taken up for development. DRDO will be responding ably to the future war fighting requirements of the tri services with advanced technologies.

GRSE's Exports to Reach New Pinnacle

Garden Reach Shipbuilders & Engineers Ltd. (GRSE), India's premier public sector shipbuilding company since 1960, began the New Year on a grand note as the company bagged two back-to-back exports orders from the governments of Guyana and Seychelles for an Ocean-Going Cargo-cum-Passenger Vessel and a Fast Patrol Vessel (FPV) respectively. "With the successful delivery of these two vessels, our export initiatives will touch a new pinnacle. We are well on our way to become a global maritime security player as these export contracts would help open new avenues in value creation," said Rear Admiral Vipin Kumar Saxena, IN (Retd.), Chairman and Managing Director, GRSE. In an interview with Aeromag, he shares the insights into the company's prowess as a world class shipbuilder capable of delivering state of the art maritime platforms across the globe.

Rear Admiral Vipin Kumar Saxena, IN (Retd.),
Chairman and Managing Director, GRSE

Could you talk about the twin export orders that GRSE has bagged this year?

For GRSE, the year began on a grand note as the company bagged two back-to-back exports orders from the governments of Guyana and Seychelles. The first export contract of the year worth 12.7 million USD was signed on 13 January for building an Ocean-Going Cargo-cum-Passenger Vessel for the Government of Guyana. The 1700 tons (appx) vessel is to be used on the coastal and riverine areas of Guyana.

Within a month of signing the contract with Government of Guyana, we were successful in signing another export contract with the Government of Seychelles for one Fast Patrol Vessel (FPV) on 3 February. The SCG Ship 'Zoroaster', will be delivered to Coast Guard of Seychelles, the archipelagic island country. The ship will be a powerful, fuel-efficient platform designed to perform multipurpose operations, such as patrolling, anti-smuggling, anti-poaching, and search and rescue (SAR) while flaunting improved habitability features with fully air-conditioned modular accommodation for 35 personnel.

Our in-house design team has developed the overall design of the FPV. The FPVs are very versatile and cost effective platforms that can be put to excellent use by the small maritime nations especially in the IOR and MENA regions.

What significance do these export contracts hold for GRSE?

GRSE is already endowed with the confidence of Govt. of India, the Indian Navy and the Indian Coast Guard having successfully built and delivered more than 100 Warships ranging from Patrol boats to Corvettes & Frigates. We immensely value the trust that they have bestowed upon us and now we are well on our way to become a global maritime security player as these export contracts would help open new avenues in value creation. GRSE has happily embraced infrastructure modernisation with technology induction and I am proud to share that our indigenous and state-of-the-art ship-design and ship-building capacity are the key behind the monumental success of brand GRSE.

We have the capability to construct 20 ships concurrently, using our modernized infrastructure and 'Modular Integrated Construction Philosophy'. Further, our dedicated, multi-disciplinary, strong Design Team is continuously working towards developing various concept designs for ships that can cater to the current and future requirements of India as well as foreign nations. As you may be aware GRSE was the first shipyard of India to have exported a warship when we delivered a Multi Role Offshore Patrol Vessel to Mauritius, the CGS Barracuda. With the successful delivery of these two vessels, our export initiatives will reach a new pinnacle.

Moreover, the contracts, while strengthening diplomatic ties of Government of India with Governments of Guyana and Seychelles, celebrates the partnership with these nations, and is a grand achievement, not only for GRSE, but also for the entire nation.

What according to you helped GRSE bag these contracts?

I dedicate the contracts to the remarkable performance of the shipyard over the last few decades that were made possible by farsighted planning, meticulous execution, courageous decisions and conviction and dedication of the Team GRSE. Special credit goes to our in-house design team who has over the years developed capability of building world-class warships deftly armed with high-tech infrastructure. Over the last six decades, we have built 787 platforms, including 106 warships for Indian Navy, Indian Coast Guard and Mauritius Coast Guard. This has helped

GRSE attain the delightful epithet of 'only organization to build and deliver a century of warships in India'. From building 5 tonne boats to 24600 tonne Fleet Tanker, GRSE has done it all and has proved its mettle as a pioneer warship builder of India.

What is the way forward for GRSE and what are the expansion plans?

Today, GRSE has crafted a niche in the field of in-house design and shipbuilding and has made significant contributions to the indigenous warship construction program in India. Indigenization has always been the watchword at GRSE and it has established its capabilities for in-house ship design and shipbuilding, across its three distinct shipbuilding units in Kolkata. This perfectly aligns with the Government of India's 'Atmanirbhar Bharat Abhiyaan'. The 100+ strong, dedicated and multi-disciplinary design team of the company relentlessly works towards developing innovative concept and designs for ships that impeccably cater to the current and future requirement of Indian Navy and Indian Coast Guard. The company is now well on track to construct state-of-the-art warships harnessing advanced modular shipbuilding technology which is delightfully at par with the best in the world

One another significant step towards Self-reliance, Modernisation and capacity augmentation at the Rajabaghan Dockyard unit dedicated for medium and small ships construction will facilitate concurrent construction of 24 ships from the existing capacity of 20.

At GRSE we are constantly striving to shift to smart manufacturing (Industry 4.0), with sparked innovations in automation, robotics and the industrial internet of things. I am confident that by introducing Artificial Intelligence, Machine Learning, Interoperability and secured connectivity enabling real time monitoring, control and optimization of processes, resources and systems will lead to significant workload consolidation across all spheres of operation.

We are also focusing on making the GRSE built versatile maritime platforms available to our friendly foreign Navies and Coast Guards. We look forward to collaboration with local shipbuilders and design houses in friendly nations towards building collective Maritime competence in the region.

Channelling towards Shipyard 4.0

Abel Mendez
International Commercial Director
Navantia

Navantia is a worldwide reference for design and construction of high technology miliary and civilian vessels. They offer global solutions in design, ToT, construction, development and integration of systems, repair and life cycle support, working closely with partners in strategic markets. Abel Mendez, International Commercial Director, Navantia, speaks about their operations, collaborations and services in the maritime sector. Excerpts from the interview:

Abel Méndez. PhD Naval Architect graduated with merits by A Coruña University (Spain). Abel joined Navantia in 1997, where he took several positions in different areas of the Company; Oil & Gas, merchant ships, offshore wind and naval vessels, working from two Navantia shipyards in Spain, Fene and Ferrol, and lately from the Madrid headquarters. During that period, Abel developed different roles in the engineering, construction and commercial departments. Relevant achievements include the formation and direction of the Offshore Wind area in Navantia, and the role of design manager of LHD ships constructed by Navantia for the Royal Australian Navy. For the last two years, Abel has held the position of Defence & Security Director, where he continues to participate in the achievement of the company's contracts in the defence area in the international sector.

The Systems division of Navantia has extensive experience in the design, development, production and integration of various systems in the maritime sector. Could you share more details about the operations?

The Systems division of Navantia has extensive experience in the design, development, production and integration of: Combat Systems, Fire Control Systems, Integrated Communications Systems, Integrated Navigation and Bridge Systems and Integrated Platform Management Systems for any type of ship: patrol vessels, frigates, submarines, aircraft carriers, amphibious vessels, minehunters, survey vessels and support ships. Additionally, Navantia has a long tradition in manufacturing and refurbishing artillery going back to the 18th century.

Navantia also provides solutions for the Army including: Battlefield Management Systems, Fire Control Systems, Forward Observer Systems, and surveillance systems providing security for both military and civilian strategic infrastructures, such as: military bases, coastlines, ports, harbours, and offshore platforms

Navantia's openness to activities that contribute to the creation of new industries, develop capacities, and the progressive acquisition of industrial skills is well known, and has taken different forms depending on the Client requirements and local capacity. A good example of Navantia's flexibility are the ToT and localization programs developed for three very different scenarios within the last 12 months; Saudi Arabia, United Kingdom and Australia. In Saudi Arabia, Navantia created a Joint Venture with SAMI (Saudi Military Industries) to develop, integrate and commercialize the first Saudi Combat System, known as HAZEM, a derivative of Navantia's CATIZ combat system. The newly created Company, called SAMINavantia, received from Navantia in September 2019 a relevant contract for the supply and integration of the combat system of five corvettes for the Royal Saudi Naval Force.

The Navantia Technology Center groups and coordinates the areas of R&D and digital technologies, channeling them towards the Shipyard 4.0. Could you shed more light onto it?

4.0 technologies are applied to four areas branded as 'Smart' by Navantia: Smart Shipyard, Smart Ships, Smart Sustainment and Smart Naval Base. Such services are developed based on 14 enabling technologies: artificial intelligence, robotics, autonomous vehicles, drones, 3D manufacturing, new materials, bid data analytics, Internet of Things, Blockchain, modeling and simulation, cloud storage, Robotic Process Automation (RPA), augmented reality and 5G

Under the category of Smart Shipyard, Navantia implements robotic welding, use of drones and autonomous vehicles, robotic process automation and the use of virtual reality tools in workshops.

Smart Ship services include Digital Twins and Integrated Services Systems (ISS), leveraging information from Integrated Platform Management Systems (IPMS).

The Smart Naval Base services include Through Life Support Facilities (TLSF) and Land Based Test Sites (LBTS), consisting

in supporting testing of software and hardware of any platform system connected to Navantia's IPMS for upkeep, upgrades and updates, the Navantia training system and the EOLO through life support tools.

Smart Sustainment includes a Data Center, a shore-based laboratory for smart sustainment, Navantia Playback center, and data repository designed to provide playback capability to the IPMS and Predictive Maintenance. ARGOS 21 is an automated tasks & analysis system to optimize the maintenance analysis tools and machine learning. Additionally, Predictive Maintenance software is used based on thermography, vibration and lube oil analysis.

The Spanish frigate F110 project incorporates many of the above smart functionalities, and will be the first to implement a Digital Twin of the vessels, which will provide a real ship "avatar", that allows to visualize the ship's state and condition from a shore base, even thousands of miles away, using digital communication resources. Also, this project is developed under a new platform Siemens NX, ensuring processes end-to-end, and data integrity.

All the above solutions and the lessons learnt by Navantia in the implementation of digital technologies are offered to the Strategic Partner and to the Indian Navy for consideration and gradual adoption through the P75(I) project.

Navantia has almost 100 years of experience designing, building and maintaining submarines for the Spanish Navy, and exporting submarines in the last decade through the Scorpene consortium with DCNS. Navantia has exported submarines to Chile, Malaysia and India, being in charge of the functional and detail engineering of the aft body

The company has been associating with India for a long time especially in submarine sector. What are Navantia's operations in India?

India is a strategic market for Navantia and has a delegation in Delhi. Navantia has participated in several naval programs in India. Among them the Scorpene Submarines, partnering with Naval Group and still under construction by Mazagon Docks Limited Mumbai. At present Navantia is associated with Larsen & Toubro for the future LPD Program

We are at the moment working quite intensively in the preparation of the Navantia design or Indian submarine P75(I), as we have been selected as one of the potential strategic partners.

During 2020, Navantia has made a great push on indigenization activities. Having a ready-made design for a very similar unit to P75(I) is a great advantage, as all equipment's and materials are defined to the last detail, permitting very immediate consultation with the local Indian industry.

At present, we continue to work very close to Indian suppliers regarding indigenization opportunities for P75(I). In the last 10 months we have submitted more than 1,000 RFIs to Indian suppliers, covering approximately 98% per cent of the cost items for the submarine

We remain very enthusiastic about this opportunity, and truly believe that the S-80P is an outstanding product which makes the selection of Navantia as designer for P75(I) a sensible low-risk choice

Navantia has been immersed, for more than 90 years, in a process of evolution and improvement of the design, production and life cycle of submarines. How strong is the submarine arm of Navantia? Who are the major customers?

Navantia has almost 100 years of experience designing, building and maintaining submarines for the Spanish Navy, being as well very successful in exporting submarines in the last decade through the Scorpene consortium with DCNS. Under this alliance, Navantia

exported submarines to Chile, Malaysia and India, being in charge of the functional and detail engineering of the aft body. Four aft submarine bodies were built in Navantia Cartagena in Spain, with two submarines (one for Chilean Navy and another one for Malaysian Navy) integrated and delivered by Navantia. The scope of work for the India project was the same, with the construction of the six units taking place in in India. The cooperation with India still continues, though in 2008 Navantia suspended the agreement with DCNS for Scorpene to concentrate into a new submarine concept designed to meet the requirements of the future Spanish Navy submarines. This was the beginning of the S-80P project, the first design developed 100 per cent inhouse by Navantia in a few decades, which is now in the final construction stage, and ready for the export market.

The S-80P is a 3,000-tonne submarine, almost double size than Scorpene, incorporating several innovative features, including a last-generation Air Independent Propulsion (AIP) system and powerful attack capabilities including heavy weight torpedoes, mines and submarine launched anti-ship and cruise missiles, etc. This is quite an exceptional performance, in fact, the capacity to launch submarine cruise missiles (SLCM) is unique for nonnuclear NATO submarines.

How did the company brace for the impact caused by the Covid-19 pandemic? What are the goals set to be achieved in the post-pandemic days?

Covid-19 pandemic has impacted Navantia activities as it has everyone's else. In Spain we have gone through a confinement period after the virus break up in March 2020.

Nowadays Navantia has mitigated the impact through the implementation of different precautionary sanitary measures to ensure the safety of all our workers, especially in production, and recovery plans have been agreed and implemented with our customers .It's been quite a remarkable achievement that we have managed to maintain the fabrication process of the Saudi Avante 2200 corvettes to guarantee the same launching rate of one unit every four months.

Luckily the impact in technical areas has been considerably lower thanks to the advantages of the digitalization process which Navantia started a few years back, applying new technologies not only to our products and services but also to our internal processes with high productivity.

Final production batch of LRSAM Missiles Flaged off

Final production batch of Long Range Surface to Air Missiles (LRSAM), designed and developed by DRDO in collaboration with various industry partners and integrated by BDL, was flagged off on 14 Feb 2021 at DRDL,APJ Abdul Kalam Missile Complex, Hyderabad in the presence of Dr. G Satheesh Reddy, Secretary, DDR&D and Chairman DRDO and Rear Admiral V Rajasekhar, VSM, Director, Defence Machine Design Establishment (DMDE).

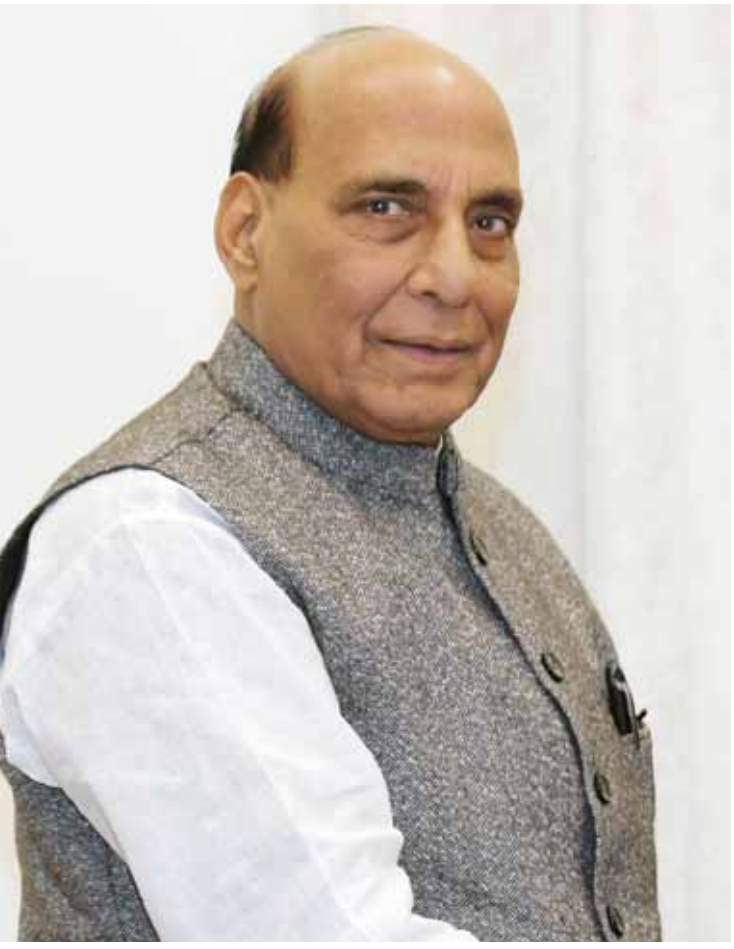
LRSAM is jointly developed by DRDO and IAI Israel to equip latest ships of Indian Navy. This LRSAM Missile system can provide point and area defence against various aerial targets including fighter aircraft, subsonic & supersonic cruise missiles. The Missile is powered by indigenously developed dual-pulse rocket motor and dual control system to impart required manoeuvrability at the terminal phase. This state of art weapon system is designed with active Radio Frequency (RF) seeker to identify, track, engage and destroy the target with high kill probability.

LRSAM system end to end performance has been successfully demonstrated through number of user flight trials from Indian Naval ships. This weapon system has been successfully productionised and has been delivered to Indian Navy.

Secretary, DDR&D highlighted the importance of indigenous production efforts and complemented the industries that have established the manufacturing facilities and successfully executed the production orders in achieving the goal towards 'Make in India'. He also commended the efforts of Missile System Quality Assurance Agency (MSQAA), DG (NAI) in streamlining the production activities at various industries across India, leading to delivery of missiles with aerospace quality standards.

Rear Admiral V Rajasekhar, of Indian Navy appreciated the efforts of DRDO for successfully completing the production order and strengthening the airmark defence capability of Indian Navy. He also urged DRDO to design and develop similar advanced weapon systems meeting futuristic warfare.

Narendra Modi
Prime Minister of India



Rajnath Singh
Defence Minister of India

Defence exports: India on an overdrive

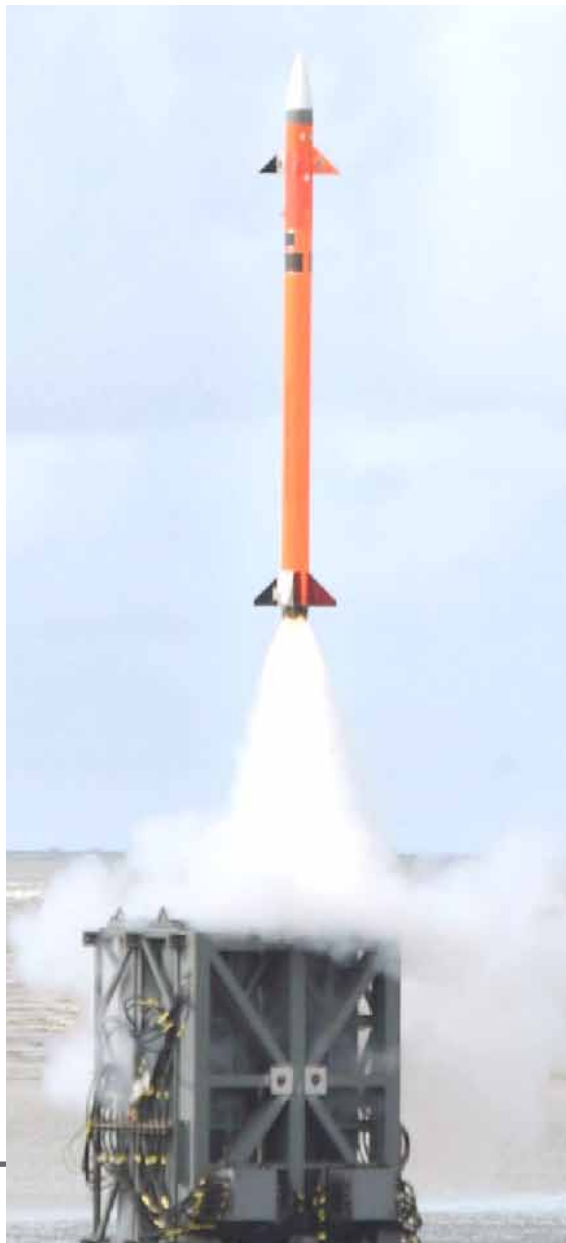
"The Indian government has set a defence export target of US Dollars 5 billion by 2025 and several initiatives are being launched to reach this figure. Among the top items intended for exports are the Light Combat Aircraft Tejas; BrahMos missiles; Advanced Towed Artillery Gun System, Pinaka rocket launchers and Combat Management System, among which Tejas has attracted the maximum attention"

रक्षा उत्पादन विभाग
DEPARTMENT OF
DEFENCE PRODUCTION

Over the years, India's defence exports have been modest owing to several restrictions and limitations. However, after Prime Minister Narendra Modi's government introduced liberal policies since 2014, defence exports have gone up substantially. According to official data, the figures have, in fact, gone up by 700 per cent in just two years. While the export authorisation was US Dollars 213 million in 2016–17, it rose to US Dollars 1.5 billion in 2018-19.

Moreover, the government has set a defence export target of US Dollars 5 billion by 2025. In order to achieve this figure, the Department of Defence Production recently released a list of 152 items that friendly nations could purchase. As many as 85 kinds of equipment and 47 sub-systems are included in the list and they are expected to be of interest to countries in the Indian Ocean Region (IOR) and Africa.

Among the top items which India intends to export are the Light Combat Aircraft (LCA) Tejas; BrahMos supersonic cruise missiles; Advanced Towed Artillery



Gun System (ATAGS), Pinaka multi-barrel rocket launchers and Combat Management System. Meanwhile, Arjun tanks and Astra air-to-air missiles are included in a separate list put out by the Defence Research and Development Organisation (DRDO). The latest list, released during the Aero India show in Bengaluru, also comprises products from private sector industries that are yet to be acquired by India's armed forces.

LCA, built by Hindustan Aeronautics Limited (HAL), has already attracted interest from South East Asia and West Asia. The HAL Chairman said that each LCA MK1A jet would be priced at Rs 306 crore for exports. Meanwhile, the trainer would cost Rs 280 crore.

As part of boosting exports, India's defence attaches posted in IOR and African countries have been directed to explore requirements in those nations for Indian systems. Currently, Tejas, helicopters and missile systems have attracted the biggest interest. Alongside, a number of Indian private companies are searching for markets for their products abroad.

Among the 30 land systems mentioned in the list for exports, the major ones are Akash and BrahMos missiles and artillery guns. Countries such as the Philippines and Vietnam are reportedly interested in procuring BrahMos. The ATAGS; the in-service K-9 Vajra howitzer; 155mm/52 Caliber towed gun and Garuda 105 lightweight field gun are among the artillery guns that have found a place on the export list . The last two are built in the private sector by Bharat Forge. Military vehicles produced by Ashok Leyland, mine protected vehicles, combat helmets and vests manufactured by private company MKU, multi-mode hand grenades and many types of ballistic protection are also meant for export.

The anti-submarine warfare corvettes made by the public sector Garden Reach Shipbuilders & Engineers, various kinds of patrol and interceptor boats and Landing Craft Utility are the major naval items which are offered to friendly countries. Lightweight and heavyweight torpedoes, naval 30 mm guns, rocket launchers, coastal surveillance systems and communication and combat management systems for ships too are planned to be exported.

Regarding air systems, India has included the Light Combat Helicopter (LCH) along with the LCA in the export list. Incidentally, neither the Indian Air Force nor the Indian Army has ordered the LCH so far.

India's defence exports were Rs 4,682 crore (US Dollars 0.66 billion) in 2017–18 and Rs 10,500 crore (US Dollars 1.47 billion) in 2018–19. Eight Defence public sector undertakings and 41 ordnance factories are engaged in exports, apart from private firms. Though there were export restrictions on organisations like OFB (Ordnance Factory Board) earlier, OFB currently exports arms and ammunition, weapon spares, chemicals & explosives, parachutes, leather and clothing items to more than 30 countries, including Thailand, Malaysia, Indonesia, Sri Lanka, Bangladesh, Germany, Belgium, Turkey, Egypt, Oman, Israel, Kenya, Nigeria, Botswana, Chile, Suriname and the USA.

Cosmos Special Tapes for Defence Sector

Cosmos Tapes & Labels Pvt. Ltd. has specialized in providing a broad range of customized products for various manufacturing industries. With a focus on delivering exceptional quality at an affordable price, Cosmos is a reliable partner for customers with special technical, regulatory, or mechanical requirements.

Cosmos Tapes is a MSME with ISO 9001:2015, ZED and IATF16949 certifications.The company's expertise is in sourcing the most suitable raw materials at optimum prices internationally and converting them as per the customers designs in their factory in India. Cosmos has a complete in-house testing facility to ensure quality according to customer needs.

Cosmos undertakes customized operations and provides excellent products of self-adhesive tape technology. The major Applications and Products in Defence manufacturing are:

Noise Reduction Solutions

They absorb, block, or damp unwanted sound waves.

Vibration Control Solutions

Solutions to control vibration while simplifying product assembly.

Thermal Insulation Solutions

Our light weight self-adhesive solutions for thermal insulation specializes in managing conductive and radiant heat energies.

Mounting Solutions

Our light weight self-adhesive tapes for mounting of components instead of bolting or screwing them, reducing the chances of rattling noises and easing the application process.

Electrical Insulating Solutions

Custom electrical insulators including Conductive Metal Foils, Polyester tapes, Glass Cloth Tapes, Nomex Paper, Polyimide Tapes etc.

Thermally Conducting Solutions

They address a crucial problem with low-powered electronic devices – the need to dissipate the sizable amounts of heat being generated.

Gaskets

Cosmos Tapes can die cut intricate custom gaskets from a wide variety of open cell and closed cell foams, rubbers and elastomers.

Specialty Tapes Solutions

The company has inhouse facility to convert special purpose tapes, sourced from the global suppliers. These tapes include:

- Thermal Conductive Tapes
- Masking Tapes (General purpose, High Temperature, Powder/CED Coating, Shot Blasting)
- Double Sided Tapes
- Filament & Duct Tapes
- Aluminium Foil Tapes
- Electrical Insulation Tapes
- Surface Protection Tapes
- Air Vent solutions for sensitive electronic/lighting equipment

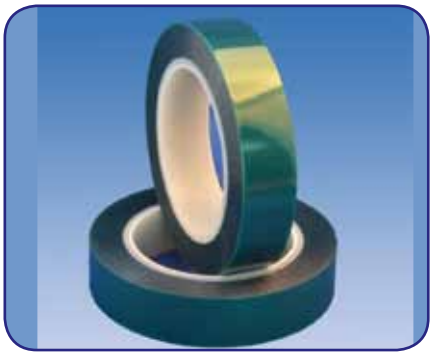
The company is trying to reduce customer's import costs of finished products by sourcing raw materials for manufacturing products requiring highly specific applications.

Double Sided Adhesive Tapes

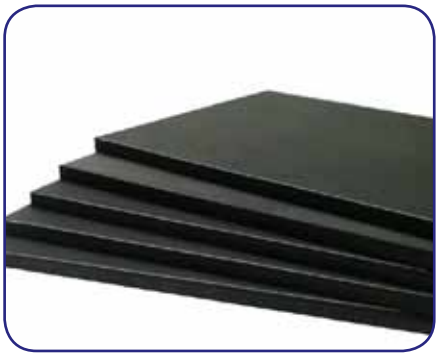
Duct Tape

Electrical Insulation Tapes

Filament Tapes



Masking Tapes



Speciality Foams

Prime Minister Hands over Arjun Main Battle Tank (MK-1A) to the Army

The Prime Minister, Narendra Modi handed over the Arjun Main Battle Tank (MK-1A) to the Army.

Prime Minister has said India has undertaken a massive effort to become self-reliant in the defence sector. This is inspired by what Mahakavi Subramaniya Bharathi writing in the oldest language in the world,Tamil, said Let us make weapons; let us make paper. Let us make factories; let us make schools. Let us make vehicles that can move and fly. Let us make ships that can shake the world. One of the two defence corridors is in Tamil Nadu. The corridor has already received investment commitments over Rupees Eight thousand one hundred crores.

He said that Tamil Nadu is already the leading automobile manufacturing hub of India. Now, Tamil Nadu evolving as the Tank manufacturing hub of India. On MBT Arjun Mark 1A, the Prime Minister declared "I am proud to handover the indigenously designed and manufactured "Main Battle Tank Arjun Mark 1A". It also uses indigenous ammunition. A tank made in Tamil Nadu will be used in our northern borders to keep the nation safe. This showcases India's united spirit – Bharat's Ekta Darshan"

The Prime Minister said that the focus on making India Aatmanirbhar in the defence sector will keep moving with full speed.

Our armed forces signify India's ethos of courage. They have shown time and again that they are fully capable of protecting our Motherland. Time and again they have also shown India believes in peace. However, India will protect our sovereignty at all costs, the Prime Minister said.

The Prime Minister paid homage to the Pulwama attack martyrs on the anniversary of the attack today. He said "We pay homage to all the martyrs we lost in that attack.We are proud of our security forces.Their bravery will continue to inspire generations."

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Trailblazing Niche Paths

Tatra Trucks, the oldest automotive factory in Central Europe, is a pioneer in making heavy-duty military, firefighting and rescue vehicles, and civilian vehicles, unrivalled in payload capacity and mobility and designed for off-road or mountain operation. Adam Dorazil, Project Manager, Tatra Trucks, speaks about their exclusive business terrains and prospects of expansion in the Middle East Asian market. Excerpts from an interview.

Adam Dorazil
Project Manager
Tatra Trucks

Being the oldest automotive factory in Central Europe, Tatra has been a pioneer in making heavy-duty off-road vehicles and trucks for combined on/off road transport, which are constantly improved to meet increasing customer requirements. Where does the company stand globally and what are the major achievements?

At present, we focus exclusively on a niche market, which are heavy trucks capable of operating under any conditions. Military, firefighting and rescue vehicles, and civilian vehicles designed for off-road or mountain operation, able to meet clients' needs without the use of complex electronic assistance systems. The contract for the supply of military vehicles to Western Europe and the Middle East or delivery of firefighting trucks to Western Europe belong to the most interesting new orders.

Could you share with us Tatra's participation highlights at the IDEX 2021 to be held in Abu Dhabi?How do you look at the Middle East Asia as a market for Tatra's business expansion?

Tatra, together with its partner companies, will show a wide range of trucks and chassis. You will see 4x4 TATRA FORCE chassis and 8x8 truck with an armored cabin and crane at our stand. Other vehicles, such as self-propelled howitzer, recovery vehicle, and other trucks will be shown at our partners stands representing a wide range of our portfolio.

The Middle East is already for 30 years the second home for TATRA. Tatra has very strong partners in the Middle East area with a long-term relationship. More than 2 500 military vehicles have been sold. TATRA is very proud to achieve with their Middle East partners a high local content. There is no better place to apply our historical experience from the Dakar and TATRAs offroad capabilities.

The unique chassis concept of Tatra has been continuously improved since 1923 – and to this day successfully imitated by no one. Could you shed more light onto this?

The TATRA-concept was firstly used at TATRA T 11 car in 1923. The flat boxer air-cooled two-cylinder engine was firmly connected with the transmission which was connected to the rear axle via a large diameter pipe. The rear axle was of a swinging half axle type without universal joints. The pipe substituted chassis frame and covered drive shaft with differential. This unusual and progressive design of vehicles started a long tradition of unique automotive chassis design as "TATRA concept". Such vehicles were very simple, easy to operate, simple to maintain, and giving good fuel economy. An entirely new line of cars and trucks of various load-carrying capacities was based on this philosophy. In the production of more than 95 years, this concept is a true testament to the soundness of the original design.

Today TATRA truck chassis consisted of a torsionally rigid 3-D frame formed by connecting the backbone tube with a conventional ladder frame via cross-members and of independent swing half-axles, swinging around the backbone tube centerline. The central backbone tube covering all parts of the driveline. This design improving vehicle mobility in difficult terrain, while increasing stability during cornering and at high road speeds.

The vehicles have very high commonality, and many brands of engines and drive trains can be installed in them. Tatra's air-cooled engines and purchased water-cooled engines from various manufacturers can be used and the engine outputs can be matched with mechanical or automatic transmissions of various brands.

For different loads, a different type of suspension is used.

In addition to standard soft cabins, armored cabins with different levels of protection can be installed in the FORCE family.

The standard chassis is available in a variety of wheelbase configurations and with up to eight axles, including rear-axle steering.

The special and military production of the company is represented by

TATRA FORCE and TATRA TACTIC. What are the main products by the division and who all are the major clients?

TATRA Force is a High Mobility Heavy Duty chassis build as a platform for various kinds of special vehicles that need superior driveability in difficult terrain, transport troops or sensitive material over difficult terrain, and with low life cycle costs. The all-wheel-drive chassis employs independent suspension with the backbone tube frame, that allows each wheel to move independently. Thanks to a modular design TATRA can produce from 4x4 chassis up to 12x12 versions. There are more than 1200 vehicles used in the UAE army and hundreds of vehicles in KSA.

TATRA Tactic is a medium-class all-wheel drive off-road logistic truck with an excellent clearance that is based on standard chassis concept with rigid axles and ladder frame. The latest version was first interduced in 2019 on the IDEX show. More than 800 vehicles are under service in KSA.

TATRA TRUCKS offers standard 2, 3, and 4-axle vehicles – frame chassis suitable for a montage of different commercial superstructures or with dump truck bodies. They are especially suitable for commercial vehicles operated in difficult off-road conditions

What are the company's products in civilian and commercial sectors? What are the customization options you offer to the customers?

Besides the special military vehicles, TATRA TRUCKS company offers standard 2, 3, and 4-axle vehicles – frame chassis suitable for a montage of different commercial superstructures or with dump truck bodies. Due to the unique design of the TATRA chassis that is used also on these vehicles, they are especially suitable for commercial vehicles operated in difficult off-road conditions.

Apart from the above said standard vehicles, TATRA TRUCKS offers customers also special customized solutions. For example 5 or more-axle customized vehicles – which are suitable especially for large mobile cranes and/or other exceptional commercial superstructures.

How did the company survive the disruption caused by the Covid-19 pandemic? What are the goals to be achieved in the post-pandemic days?

The Covid-19 pandemic had no major impact on the company's operations or results in 2020. Production ran without stopping, we only had to adjust the production plans according to the possibilities of our suppliers. As for this year's targets, we are ready for both alternatives, lower market demand, as well as its rapid recovery. Of course, we are working intensively to make this year even more successful than the previous one.

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AEROSUN MEDIA PUBLICATION

Rosoboronexport showcases State-of-the-art Armaments at IDEX

JSC Rosoboronexport (part of Rostec State Corporation) showcases the major newly-designed products of Russia's defence industry and pieces of Russian military equipment, mostly demanded in the world arms market, at the largest international defence exhibition IDEX 2021.

"The Middle East and North Africa are now among key customers in the arms market. This region accounts for about 1/3 of the total market volume. Arms with the "Made in Russia" trademark are well known and sought-after here. They have made a very good showing in adverse climatic conditions – on the sea, on the ground and in the air. Taking into account all the above mentioned, the region is very important for us. At year-end 2020, the MENA countries accounted for over 50 % of all export supplies through Rosoboronexport. In addition to the growth of exports and product mix, we have considerably expanded the geography of our cooperation in the region. In 2021, these positive trends will be continued in accordance with the objectives, set out for us by the country's leadership," said Director General of Rostec State Corporation Sergey Chemezov.

Traditionally, Rosoboronexport acts as the organizer of Russia's joint display at IDEX 2021, which in total occupies more than 1200 square meters of the exhibition space in Hall 12. The joint display will represent products of the leading holdings of the Rostec State Corporation, including JSC High Precision Weapons, Uralvagonzavod, Kalashnikov Group, Technodinamika, United Instrument Manufacturing Corporation, Shvabe Holding, and the largest Russia's defence industry companies – Almaz-Antey Air and Space Defence Corporation, JSC Concern Morinformsystem-Agat, Research Production Association RusBiTech, Proekt-Technika Corporation, and the Kazan Gunpowder Plant.

Russia's joint display is focused on the demonstration of technical assets and solutions, aimed at responding to present-day security threats and challenges, primarily in conditions of attack weapons development, including missiles of various ranges and strike UAVs. Rosoboronexport will introduce at IDEX 2021 its approaches and solutions, above all, in the area of countering terrorist groups and provision of security of vital state, infrastructure, transportation and energy installations.

"Rosoboronexport will demonstrate newly-designed products from its export catalogue, including the new armoured personnel carrier and infantry fighting vehicle on the basis of the Boomerang unified wheeled combat platform, air defence missile systems Antei-4000, Viking and Tor-E2, which will be done for the first time in this region. For the first time ever we will hold public presentations of tank T-14 Armata and new types of firearms of Russia's production – assault rifles KORD, Lebedev pistol and the newest Kalashnikov assault rifle AK-19, we will speak as well on the system, designed for countering unmanned aerial vehicles, which is a Rosoboronexport's package solution, and on training simulator complexes, produced in Russia," added Alexander Mikheev.

At its display, Rosoboronexport will demonstrate over 400 items of its military equipment nomenclature. The display includes mock-up models of aviation

equipment, i.e. the Su-35 multi-role supermaneuverable fighter and Mi-38T transportation and assault helicopter, which may considerably increase combat capabilities of an aviation task force of any country in the Middle East or North Africa. It will also incorporate air defence complexes S-400 Triumph and Tor-M2KM, as well as the Kupol-PRO anti-drone complex, which are popular in the Middle East market.

The naval section of the state special exporter's display will include presentations of the mock-up models of the patrol boat of project 22160 and the Karakurt-E small missile ship of project 22800E by the Ak Bars Shipbuilding Corporation.

The V.A.Degtyaryov Plant, demonstrating the new KORD assault rifle of calibres 7.62 and 5.45 mm for the first time abroad, counts on increased public interest, as well as LLC KBIS with its long range sniper rifles of the Lobaev Arms trade mark - DVL-10M1 Saboteur, TSVL-8 Stalingrad, DXL-3 Longstrike and DXL-4 Sevastopol, which are already well known by the specialists. Rosoboronexport's exhibit will also accommodate mock-up models of armoured vehicles of the Typhoon and Tornado families.

SAMI to be part of Saudi Pavilion at IDEX

In keeping with its commitment to developing the capabilities of Saudi Arabia's military industries sector and continuing to play an active role in localizing the Kingdom's military spending, Saudi Arabian Military Industries (SAMI), a wholly-owned subsidiary of the Public Investment Fund (PIF), will participate in the IDEX 2021 under the title 'Invest Saudi' through the Saudi Pavilion.

Supervised by the General Authority for Military Industries (GAMI), the Saudi Pavilion will bring together several major Saudi national institutions and companies specialized in the field of military and security industries. The exhibition will be held from 21 to 25 February at the Abu Dhabi National Exhibition Center in the UAE capital, Abu Dhabi.

SAMI aims to represent the Kingdom of Saudi Arabia at the international exhibition and support the vision of the Kingdom's leadership for the military industries sector. SAMI also supports PIF's efforts in localizing cutting-edge technology and knowledge, as well as building strategic economic partnerships. The national defense champion seeks to contribute toward the localization of over 50% of the Kingdom's military industries sector by 2030.

Besides, SAMI will exhibit its most significant accomplishments in the sector and its local capabilities in meeting the operational needs of the military. SAMI will also showcase its innovative military products and comprehensive defense systems, spread across its Land Systems, Aeronautics, Defense Electronics, Weapons and Missiles, and Emerging Technologies divisions. SAMI's exhibits will also include the products and technologies developed by its affiliates Advanced Electronics Company – AEC (a wholly-owned subsidiary), Accessories and Components Company (AACC), SAMI Navantia Naval Industries (a joint venture with Navantia S.A.), SAMI L3Harris Technologies (a joint venture with L3Harris Technologies), and SAMI CMI Defense Systems (a joint venture with CMI Group).

AL JASOOR Joins Forces with Raytheon Emirates, EARTH for Rabdan Vehicles

AL JASOOR, the exclusive supplier of the Rabdan 8x8 Infantry Fighting Vehicle, announced its collaboration with Raytheon Emirates and Raytheon Intelligence & Space (RI&S) to embed a High-Energy Laser Weapon System onto AL JASOOR's signature Rabdan 8x8 platform. EARTH, a leading facilitator of state-of-the-art R&D, engineering, and technology integration, and sister entity of AL JASOOR within EDGE, is responsible for the seamless integration of the Rabdan vehicle with the advanced laser system.

Announced ahead of the International Defence Exhibition and Conference (IDEX), the integrated vehicle is on display as part of the broader EDGE stand.

The next generation Rabdan 8x8 armoured fighting vehicle is an advanced, mission-ready platform built to meet a range of versatile objectives. Highly mobile on land and water, Rabdan is available in several configurations and can be equipped with different levels of armour protection to ensure tactical and technical advantages.

Raytheon's High Energy Laser Weapon System is powered by technologies that use photons, or particles of light, to carry out military missions. The cutting-edge product uses an advanced electro-optical/infrared (EO/IR) sensor, to detect, identify and track multiple threats, primarily from unmanned aerial vehicles (UAVs). Once targeted, the system is designed to rapidly and precisely engage, and neutralize, the non-cooperating UAV.

Advanced Electronics to Showcase Electronic Warfare, C4ISR at IDEX

Advanced Electronics Company (AEC), a Saudi Arabian Military Industries (SAMI) company, will participate in IDEX as part of the Saudi pavilion under the slogan of 'Invest in Saudi Arabia'.

A regional defense and aerospace leader providing world-class services, systems, and solutions in the fields of Electronic Warfare, C4ISR, Electronics and Cyber Security, AEC will showcase its latest military technologies and products at IDEX 2021. Underlining its commitment to playing a key role in the localization of 50 percent of the Kingdom's military and security spending as envisaged in the Saudi Vision 2030 program.

On display at AEC's booth in the exhibition will be services, solutions and systems in the fields of Electronic Warfare, C4ISR (Command, Control, Communications, Computers, Combat Systems, Intelligence, Surveillance, and Reconnaissance), and Cyber Security including Radio Over IP System (RoIP), Software Defined Radio (SDR), Unmanned Surface Vessels (USVs) and Electronic Intelligent Solutions (ELINT).

Abdulaziz Al Duailej, CEO of AEC, said: "With businesses and industries returning to normal operations, we at AEC consider that our participation in IDEX 2021, as part of the Saudi Pavilion, will provide us with an excellent opportunity to highlight our innovations in the defense sector to prospective regional and international stakeholders. We are keen on gaining insights into new industry trends and customer needs and exploring new growth opportunities to advance our commitment to supporting the Kingdom to achieve the Vision 2030 goal of 50% localization.

Almaz – Antey to Unveil Antey-4000 at IDEX

Almaz – Antey Air and Space Defense Corporation presents its main military product range at IDEX – 2021 international defense exhibition and conference in Abu Dhabi (UAE). The company's delegation includes experts from its six subsidiaries.

The company's exhibition stand will provide visitors information about latest long, medium and short-range air defense, upgrade options for earlier produced equipment, and other Almaz – Antey designs.

Almaz – Antey exhibits models of Viking, Tor-M2E, Tor-M2K, Tor-M2KM surface-to-air missile systems (stationary and mobile versions), Palma ship-based automated anti-aircraft artillery system, Komar turret launcher for Igla-type MANPADS.

It will be the first time the company presents information on its Antey-4000 long range surface-to-air missile system of its Antey line at a foreign exhibition. The system features new capabilities against air targets, able to engage them at higher range, altitude and speed.

Due to its high performance, Antey-4000 can be used for protection of key administrative, industrial and military installations. Mounted on a full-tracked chassis, it can move easily across rough terrain and protect areas and military units at the theater of war. Antey-4000 surpasses its predecessor Antey-2500 by range, altitude and speed of aerodynamic targets and is unmatched in its class.

Another novelty is the upgrade of Stela SAM system, widely known across the world, to the level of Sosna SAM system, which includes 100% longer range, 200% larger ammunition, hampered detection of the unit operation and fully automated tracking and engagement of the target.

Presentations on Triumph S-400, Favorit S-300PMU2, Buk-M2E, Sosna SAM systems, Tunguska-M1 gun/missile SPAAW, Shilka-M4 ZSU-23-4 SPAAG, simulators and target stations for anti-aircraft systems operators' training, and on the company's offers to upgrade and repair earlier supplied equipment will be available as well.

Designated screens will feature information about naval anti-aircraft

protection products, including Rif-M and Shtil-1 ship-based SAM systems, Palma ship-based automated anti-aircraft artillery system, and Komar turret launcher.

Almaz – Antey deputy general director for international trade Vyacheslav Dzirkaln stated, "Given the complex situation in the world, we participate in IDEX-2021, one of the most popular global defense exhibitions, with the view to strengthen the company's image as a reliable supplier of exclusive products helping its client countries retain their sovereignty and stay secure."

He noted that the company will again demonstrate its research and production potential, including valuable opportunities for upgrade of earlier supplied equipment.

The deputy general director emphasized that the company had always demonstrated independent technical solutions, economic stability and provided highly competitive products to its customers.

Almaz – Antey is entitled to engage in foreign trade deals at its own discretion with regard to defense products, including supplies of spare parts, repair and upgrade of earlier supplied equipment.

Almaz – Antey is one of Russia's largest integrated defense sector conglomerates, employing some 130,000 people. The company's products are in service in over 50 countries.

PBS to unveil PBS TJ100P turbojet engine at IDEX

The PBS TJ100P engine has been purpose-designed for unmanned disposal applications, target drones, and other air-launched and ground-launched UAVs. PBS TJ100P is the modification of the successful PBS TJ100, that has worldwide sold more than thousands of units.

The customers will appreciate that the fuel lubricated engine without a separated oil system has no tilt angle limits during start and flight operation. The engine has capability of air-launched accelerated start within 8 seconds.

The electrical power output up to 2.3 kW fulfills the growing requirements of the current market. Due to a reduced weight of 17.2 kg and thrust of 1,250 N, the PBS TJ100P turbojet engine achieves an excellent thrust-to-weight ratio in its thrust category.

The engine can be adjusted for saltwater landing recovery. Other modifications are the customized design of fixing points or extended exhaust nozzle.

"We try to adapt to market demand as much as possible, both in developing entirely new products and modifications of the current ones." States Mr. Milan Macholan, the CEO of PBS.

Main technical parameters of the PBS TJ100P engine

Turbojet engine PBS TJ100P	
Maximum thrust	1,250 N
Maximum speed	0.8 M
External diameter of the engine	272 mm
Engine weight	17.2 kg
Maximum altitude for air-launched start	6,000 m
Maximum operating altitude	10,000 m
Electrical power output	750-2,300 W
Min. / max. ambient temperature	-35/+45 °C
Fuel	JET-A1

Why PBS?

- 50 years of experience in aerospace industry
- More than 14,000 supplied aerospace turbine units
- EASA certification and DOA, POA, MOA approvals certifications

PBS Product segments

- Aerospace (turbojet engines, auxiliary power units, environmental control units)
- Cryogenics (turboexpanders, pumps and compressors for liquefaction of inert gases)
- Power engineering (power generating units, turbines, industrial boilers)
- Investment casting (nickel-based, cobalt-based superalloys castings)
- Service and maintenance (APUs)

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Russia unveils to the new anti-

Rosoboronexport (part of the Rostec State Corporation) in 2020 has started promoting the P-18-2 Prima high-mobility 2D surveillance and acquisition radar to the foreign market. Aero India 2021, that took place in February in Bangalore, India, became the foreign premiere of the system.

According to the company, the Prima solid-state radar is based on modern hardware components and digital signal processing and generation technology. It features high energy potential and increased immunity, points out the company. The radar is designed to detect, track, locate and identify air targets of various classes and types as friend or foe in both jamming and clutter environments, take the bearing of jammers, and feed radar data to users' automated command-and-control systems.

The P-18-2 is distinguished from most other radars available on the market by its high mobility achieved through the installation of all equipment and antenna post on one vehicle. At the same time, its crew consists of only two people who can operate both from the equipped cabin and remote workstations. The radar features a high level of automation and can be deployed and stowed within about 5 minutes.

the global market stealth radar

The Prima radar operates in the VHF band and is capable of detecting any aircraft, including stealth ones. Its range coverage exceeds 320 km and elevation coverage is up to 45 deg. The minimum detection range is 500 meters. The developers have introduced a number of technology solutions to ensure the radar's operation in a jamming environment, difficult terrain and in adverse weather conditions. The radar automatically detects and tracks low-speed and low-visibility targets in a clutter environment.

The radar is equipped with advanced satellite navigation equipment exploiting GLONASS/GPS signals that provide automatic positioning. It has a built-in diesel power plant and a power take-off generator, and can also be connected to a three-phase general-purpose electrical network.

Another major product in the Russian radar portfolio is the Resonance-NE long-range low-observable aerial target acquisition radar. This VHF-band phased array radar is designed for effective long-range detection of a wide scope of existing and prospective flying objects such as low-observable cruise and ballistic missiles, as well as hypersonic aerial vehicles, including stealth ones, in contested electronic environment and under natural noise. The detection range reaches 1100 km.

The multi-role, multi-domain UAV solution from Schiebel: The CAMCOPTER® S-100

Schiebel has more than 20 years experience with the development and production of UAVs. The company has production facilities and offices in Abu Dhabi, Austria, Australia and the US. The Middle East is an important region for Schiebel, given its first major contract back in 2005 for the CAMCOPTER® S-100 came from the United Arab Emirates. The CAMCOPTER® S-100 is flown all over the world with clients such as the Royal Thai Navy, Royal Australian Navy, the European Maritime Safety Agency, and many more.

For the European Maritime Safety Agency, Schiebel, with its CAMCOPTER® S-100, supports Coast Guards all over Europe – most recently in France, Denmark, Croatia and Finland – to carry out border security and maritime surveillance. With its vast experience at land and at sea, it has proven its outstanding capabilities at many occasions.

Most recently, the French Navy acquired four additional S-100 UAVs, which will be integrated on their Mistral-class amphibious helicopter carriers Tonnere and Mistral. The initial two S-100s were already fully integrated on their helicopter carrier Dixmude. This was the first time in Europe, a rotary wing UAS was fully operational and connected to the defence system of an amphibious helicopter carrier.

In August 2020, Schiebel together with Nordic Unmanned carried out the world's first full-scale offshore UAV cargo delivery from shore to an active oil and gas installation for Equinor. The demonstration simulated the scenario of an urgent requirement for spare parts at the gas production Troll A in Norway. The CAMCOPTER® S-100 successfully carried out the long-range delivery and the demonstration also included an aerial platform inspection as well as a simulated search and rescue mission.

Meanwhile in Australia, the Royal Australian Navy (RAN) has been operating the CAMCOPTER® S-100 since 2018. Currently, the RAN UAVs are fitted with Schiebel's proprietary heavy fuel engine, the S2. Given the single fuel policy adopted by the world's navies, the heavy fuel engine is Schiebel's alternative option to its current propulsion unit.

Schiebel's CAMCOPTER® S-100 Vertical Takeoff and Landing (VTOL) Unmanned Air System (UAS) is currently in use on five continents with 34 customers. More than 350 Unmanned Air Vehicles (UAV) have flown a total of 100,000 hours so far. The S-100's small footprint makes it the ideal solution for small ships and it has operated from more than 30 different ships with 10,000 maritime flight hours and 2,000 deck landings to date.

Indian Navy's Largest Wargame; TROPEX 21

Indian Navy's largest war game – the biennial Theatre Level Operational Readiness Exercise (TROPEX 21) - which commenced in early January, is currently underway with participation of all operational units of Navy including ships, submarines, aircraft as well as units of the Indian Army, Indian Air Force and Coast Guard. The exercise will culminate by third week of February.

The exercise is being conducted over a vast geographical expanse in the Indian Ocean Region including its adjunct waters and is aimed at testing combat readiness of the Navy in a complex multi-dimensional scenario set in the context of the current geo strategic environment. The Theatre Level exercise also aims to validate Navy's offensive-defence capabilities, safeguard national interests in the maritime domain and promote stability and peace in the Indian Ocean Region. Conduct of TROPEX is being overseen by Naval Headquarters with participation from all three Commands of the Indian Navy and the Tri-Services Command at Port Blair.

TROPEX is being progressed over distinct phases that also test the Navy's transition from peacetime to hostilities. In the first phase, the Indian Navy had conducted coastal defence exercise 'Sea Vigil' along the entire coastline and Island territories of India on 12-13 January 2021. This exercise aimed to validate the coastal defence setup of the country, which was entirely revamped after the 26/11 Terror attacks at Mumbai. The exercise witnessed large-scale participation from Indian Navy, Coast Guard, Marine Police of 13 coastal States and Union Territories along with other stakeholders in the maritime domain. Valuable lessons emerging from the exercise are being incorporated in the existing procedures to further fine-tune the coastal defence architecture of the country.

Exercise Sea Vigil was followed by a large-scale Tri-Service joint amphibious exercise AMPHEX-21, which was conducted in the Andaman and Nicobar group of Islands from 21-25 January. The amphibious exercise was aimed at validating India's capabilities to safeguard the territorial integrity of its Island territories and enhance operational synergy and joint warfighting capabilities amongst the

three Services.

The Weapon Workup Phase of TROPEX, which concluded recently, witnessed multiple 'on-target' ordnance deliveries including missiles, torpedoes and rockets from frontline warships, aircraft and submarines and demonstrated the lethal firepower of the Indian Navy and reaffirm the Navy's capability to carry out long range maritime strikes in the Indian Ocean Region, a capability that is central to meeting operational challenges and ensuring safe seas and secure coasts.

This large scale Theatre Level Exercise puts to test and validate Navy's Concept of Operations in various conflict scenarios, hone its warfighting skills, bolster its role towards maritime security in the wider Indian Ocean Region and is in keeping with the theme of being a 'Combat Ready, Credible and Cohesive force'.

Indian Navy Ship Pralaya Arrives in Abu Dhabi to participate in NAVDEX & IDEX 2021

Indian Naval Ship Pralaya arrived at Abu Dhabi, UAE to participate in the NAVDEX 2021 (Naval Defence Exhibition) and IDEX (International Defence Exhibition), scheduled from 21 to 25 February 2021.

INS Pralaya, the second ship of the indigenously built Prabal Class Missile Vessels, was commissioned in the Indian Navy on 18 December 2002. The 56 m long ship, displacing about 560 T is capable of speeds in excess of 35 knots and is fitted with an impressive array of weapons and sensors. These include a 76.2 mm medium range gun, 30 mm close range guns, chaff launchers and long range surface to surface missiles. The ship, built indigenously at Goa Shipyard Limited, bears testimony to capabilities of the Indian ship building industry and is a versatile platform capable of performing a wide variety of surface warfare missions.

Participation of INS Pralaya in NAVDEX is aimed at showcasing the strengths of India's indigenous ship building, in line with Hon'ble Prime Minister's vision of 'AtmaNirbhar Bharat'. In addition, participation of an Indian Navy Ship in NAVDEX ,it also highlights close relations between India and UAE.

Defence relations between India and UAE have been steadily growing since the upgradation of bilateral relations to a 'Comprehensive Strategic Partnership' during the visit of Crown Prince of Abu Dhabi, His Highness Sheikh Mohamed bin Zayed Al Nahyan was the Chief Guest at India's Republic Day celebrations in January 2017. Towards enhancing interactions between the two navies, inaugural edition of Indian Navy – UAE Navy bilateral exercise GULF STAR - 1 was conducted in March 2018. The next edition of the exercise is likely to be conducted in 2021. In addition, Indian Navy ships have been making regular port calls at UAE for promoting maritime cooperation. INS Mysore, an indigenously built guided missile destroyer, mission deployed in the region, is also making a port call at Abu Dhabi, UAE from 19 to 22 Feb 21.

Etihad and Gulf Air announce Strategic Cooperation Agreement

- Expansion of existing codeshare agreement to strengthen both airlines' networks beyond Abu Dhabi and Bahrain hubs
- Enhanced reciprocal frequent flyer benefits for Etihad Guest and Falconflyer members
- Schedule optimisation and connectivity improvements on Abu Dhabi – Bahrain route
- Developing a more seamless customer journey between Abu Dhabi and Bahrain

Etihad Airways, the national airline of the United Arab Emirates, and Gulf Air, the national carrier of the Kingdom of Bahrain, have signed a Strategic Commercial Cooperation Agreement (SCCA) to deepen their partnership between Abu Dhabi and Bahrain and beyond the respective hubs.

The wide-ranging SCCA, subject to obtaining applicable governmental and regulatory approvals, sets out specific actions for deepening and broadening commercial cooperation, building on the Memorandum of Understanding (MOU) the airlines signed in 2018.

The SCCA envisages a phased approach to closer collaboration between the partners. In the first phase, by June 2021, the scope of the partners' codeshare agreement, first signed in 2019, will be significantly expanded. Etihad and Gulf Air will be able to offer up to an additional 30 combined destinations beyond the Abu Dhabi and Bahrain hubs, across the Middle East, Africa, Europe and Asia.

The partners will work together to optimise joint operations on the Abu Dhabi-Bahrain route, with improvements to network connectivity over each of the partners' hubs. The partners will also enhance their respective offerings to premium tier customers of Etihad Guest and Falconflyer, including reciprocal lounge access at the hubs and enhanced recognition through a guest's journey, regardless of the operating airline.

Additionally, the partners will work together to improve the customer journey on Abu Dhabi –Bahrain, making it more seamless, regardless of the operating carrier, with enhanced and harmonised policies and products in areas such as baggage and ancillaries.

The 2018 MOU also provided for exploration of MRO, pilot and crew training, and cargo opportunities, which the parties will now re-visit in light of current market opportunities and company requirements.

The Strategic Commercial Cooperation Agreement was signed by Tony Douglas, Group Chief Executive Officer, Etihad Aviation Group, and Captain Waleed AlAlawi, Gulf Air's Acting Chief Executive Officer.

Tony Douglas said: "This agreement reinforces the strength of the ongoing partnership between our two airlines. We look forward to exploring pragmatic ways in which the two carriers can increasingly work seamlessly between our two capitals, enhance benefits and customer experience for our most frequent travelers and further extend the reach of our joint networks beyond our hubs."

Captain AlAlawi said: "Our relationship with Etihad Airways has always been strong and today we are reaching a higher level of collaboration with many more opportunities in the horizon between the national carriers of the Kingdom of Bahrain and the United Arab Emirates. This agreement will empower both of us to offer a more elevated experience to passengers and widen their travel options."

Reinforced Might

Abraham du Plessis
CEO, NIMR

NIMR, an EDGE entity in the Platforms & Systems cluster and a leading manufacturer of mission-ready, high-performance, combat-proven light- and medium-weight wheeled military vehicles is currently preparing to roll out the second-generation of its product portfolio. Abraham du Plessis, CEO, NIMR, speaks about its evolution as the largest military vehicle manufacturer in the region competing with the largest international producers. Excerpts from the interview:

Abraham du Plessis is the Chief Executive Officer (CEO) of NIMR, an EDGE entity within the Platforms & Systems cluster, that is a leading manufacturer of mission-ready, high-performance light- and medium-weight wheeled military vehicles. In this role, he is responsible for the business growth of NIMR, regionally and international through their competitive products and services.

NIMR has two decades of experience in producing high-performance light- and medium-weight wheeled military vehicles whilst adhering to the most demanding international standards. What are the major milestones in this journey of success?

NIMR celebrated its 20th anniversary in 2020. The company has come a long way since commencing operations with our first vehicle, called NIMR1, in 2000.Since then, the company has grown from strength to strength, with our vehicles building a reputation for their agility, mobility and versatility.

Today, NIMR has an extensive portfolio of mission-proven military vehicles capable of addressing the most demanding duty-cycle requirements, and is currently preparing to roll out the second-generation of its product portfolio that will reinforce its position as leading manufacturer of combat-proven military vehicles.

To meet increasing demand from Armed Forces in nine nations, NMR opened a 37,500m2 production facility in Abu Dhabi, which is the largest military vehicle manufacturer in the region and competes with the largest international producers.

The company has pioneered many firsts in the region in an eventful two decades. We now have our sights set firmly on the next 20 years of growth.

Through its joint ventures with defence operators in other countries, NIMR transfers knowledge and technology, and builds skills in different regions of the world. In which countries does NIMR have presence, and who are its major clients?

We have a joint venture with the Algerian Ministry of Defence to produce the NIMR vehicle range in Algeriaand are also working to expand our footprint in Eastern Europe. As part of these efforts, we initiated collaboration with VOP CZ, a state-owned enterprise established by the Ministry of Defence of the Czech Republic to address the national market demand, along with those of other Visegrad countries. In 2017, NIMR and VOP CZ facilitated the debut of the AJBAN 440A configured to European specifications.

NIMR offers three main product ranges – AJBAN, HAFEET, and JAIS. Could you shed some light on the vehicles in these series?

The AJBAN Multi-Role Armoured Vehicles, NIMR's best-selling vehicles, are designed for use in a wide range of specialist military roles. They offer high levels of survivability, mobility, and firepower. The seven-seater 447A features a highly configurable armoured cabin, designed for functions such as tactical response, border patrol, reconnaissance, counterinsurgency, and special forces. The range comprises AJBAN 420, AJBAN 440, AJBAN 450 and AJBAN Internal Security Vehicle.

The NIMR AJBAN Long-Range Special Operations Vehicle (LRSOV) is an open-top 4x4 reconnaissance vehicle designed for use by Special Forces. Light and powerful,

capable of accessing all terrains, in addition to being helicopter-transportable, the vehicle can be customised to accommodate a range of user-specified equipment.

Meanwhile, the NIMR HAFEET 630A is a highly mobile 6x6 protected vehicle that offers an optimal combination of payload, mobility, and protection in the harshest environments. The vehicle can be integrated with a variety of mission and weapon systems.

The HAFEET class provides a multi-purpose platform for all military requirements, from utility vehicles to fully protected patrol vehicles. A universal 6x6 chassis is utilised for a common logistic footprint to minimise the burden of training, maintenance, and spare parts management for the user.

Finally, the JAIS classis the next generation of mine-resistant ambush protected (MRAP) vehicles that strikes the right balance between firepower, survivability, and mobility for modern, conventional, and asymmetric operations. A battle-proven 'crew citadel' protects against mine, improvised explosive device (IED), and ballistic threats.

Offering cost-effective solutions for recce, patrol, utility, and specialist roles, such as ambulance,the highly modular family of vehicles features modern suspension and powertrain, high power-to-weight ratio, and excellent situational awareness.

NIMR has a 37,500m² state-of-the-art production facility that consistently produces to a high quality and in large volumes. Could you elaborate on your production facilities and quality standards?

The facility has the capacity to produce up to 1,500 vehicles per year, and the capability to supply every component at each stage of the assembly process. Total production flexibility has been incorporated into the process layout. This allows for multiple model types to be built simultaneously, maximising product output and efficiency, and enables NIMR to quickly reorganise resources to respond to the changing requirements of its customers.

All NIMR vehicles undergo a rigorous testing process during the quality control phase before they leave the factory.Visual management systems are in place to allow for real-time production monitoring, provide an active interface for requests and support to identity and rectify problems, and facilitate seamless communication.

The in-house design, engineering, and R&D capabilities of the company encompass all aspects of military vehicle technology – from driveline to protection systems. How strong is the engineering arm of NIMR?

Our military engineers are drawn from across the globe. Their combined experience allows us to understand and forecast field data, combat situations, and the evolving operational requirements of our customers. Meanwhile, our onsite capabilities enable us to integrate best-in-class technology into our vehicles to give our clients a competitive edge, and to use the latest simulation tools and techniques to rapidly mature our designs, shorten the design cycle, and enhance production capacity. Lastly, we have been growing a world-class test capability to verify, validate and improve all aspects of our designs.

'NIMR has a joint venture with the Algerian Ministry of Defence to produce the NIMR vehicle range in Algeria and it is working to expand its footprint in Eastern Europe. It has initiated collaboration with VOP CZ, a state-owned enterprise established by the Ministry of Defence of the Czech Republic to address the national market demand, along with those of other Visegrad countries'

GAL: Ultimate Sustainment Solutions

Mohammed Saeed Al Khemairi
CEO,GAL

While committed to providing fleet readiness to the UAE Armed Forces, GAL is widening its ambit into the commercial realm and working towards expanding its global footprint, seeking business opportunities outside the UAE, says Mohammed Saeed Al Khemairi, Chief Executive Officer, GAL, in this interview. Excerpts:

Mohammed Saeed Al Khemairi is Chief Executive Officer of GAL, and in this role, he is responsible for leading the overall strategy and strategic objectives of the company, including the implementation of its functional objectives and overseeing critical management aspects of the business, operations, support and people management. Prior to joining GAL, Al Khemairi was Director of Inter Aviation within the UAE Armed Forces. Al Khemairi brings to his role 24 years of experience as an aviation professional, exposed to high-level strategic and operational initiatives, including infrastructure design, process reengineering, turnaround management, and reorganisation of complex business challenges.

GAL has been providing integrated aviation readiness solutions for both military and civilian customers for more than 13 years. How challenging has been the road to success, and what is the company's position now in the industry globally?

GAL is a 100 per cent UAE-owned company and was founded in 2007. GAL has over 5,000 employees and supports more than 500 aircraft. Over the years, GAL has built numerous strong relationships with the major OEMs and formed strategic alignment with complementary MRO partners.

GAL maintains a rigorous operations and compliance system that has earned approval from the U.S. Government for the official licencing of our defence services. We have also obtained international certifications including the ISO 9001 for quality management and ISO 27001 for Information Security Management. Our aim is to become the Middle East's leading provider of aviation MRO services, which I'm proud to say we are getting closer now that we are growing successfully even beyond the UAE.

Could you give a detailed picture of GAL's range of maintenance, repair, overhaul, and support services which are offered to military and civilian operations for fleet readiness?

We provide integrated aircraft sustainment solutions through specialised manpower and technical assistance, and we have agreements with major original equipment manufacturers, suppliers and MRO centres for delivering maintenance, repair and overhaul services that cannot be performed in the UAE.GAL's core services include aircraft maintenance, technical and engineering support, logistic and supply chain management, command level advisory support, manpower outsourcing, augmentation solutions, simulator maintenance and specialised training. As an EDGE company, we have the unique ability to work with other companies within the Mission Support cluster, like AMMROC and HORIZON to provide complete solutions to our customers including aircraft modifications or upgrades, tip to tail management and supply chain support.

How important has been the partnership or collaborations with industry leaders and engineers' innovative approach in addressing the customer needs? Could you also shed some light on the engineering minds you work with?

We have collaborated and partnered with major OEMs and MRO providers such as AAR, Airbus, Boeing, Lockheed Martin, GE, Dassault, among others. Locally, we work very closely with SANAD Aero,Abu Dhabi Aviation, and our sister entity AMMROC. From routine inspections to customised repair and overhaul, we ensure that every maintenance action performed – whether simple or complex; corrective or preventive, is executed to the highest quality and safety standards.GAL has over 4000 subject matter experts on board as employees - fully certified and trained to undertake maintenance, in-routine inspections, and in-depth repair operations on all relevant platforms and aircraft.We only employ the

most talented technicians and engineers, both locally and internationally, to work on rotary-wing platforms — making them subject matter experts in the process.

GAL has expanded its client base and now holds several maintenance and integrated logistics services contracts across the UAE. How does the company look at the South Asian and African markets for expanding business?

We have signed agreements with the Kenyan Ministry of Defence to provide them MRO services, specialised maintenance engineers, spare parts and repair management. We have also collaborated with China National Aero-Technology Import & Export Corporation (CATIC), which will allow GAL to establish a warehouse in Abu Dhabi and be the hub for all the spare parts distribution of CATIC in the Middle East. We have several ongoing contracts with the UAE Airforce to provide comprehensive maintenance and logistics support for its fleet, to provide specialised manpower and technical and consultancy support services. And currently we are working towards expanding our global footprint and are seeking business opportunities outside the UAE.

What are the other challenges you face in meeting the requirements of a rapidly changing world as a professional aerospace services provider?

We have noticed that there is an increased requirement for aircraft modifications and upgrades because of the aging of the aircraft and to keep up with the latest technology. Therefore, today we are providing additional resources to increase our focus on aircraft modifications and upgrades. We've also increased our partnerships with specialised engineering companies and increased our activity with AMMROC, leveraging their state of the art facilities and their experienced engineering capability. With these initiatives, we believe that we are in a well-placed position for the changing aerospace market.

What is the roadmap ahead for GAL? What are the goals and objectives you have set for the company?

We are committed to providing fleet readiness to the UAE Armed Forces. That will always remain our main objective. Furthermore, we are looking forward to taking GAL to the commercial and other regional markets through our strategic relationship including working with AMMROC, SANAD Aero, Abu Dhabi Aviation and other local companies. We believe this will provide promising strategic opportunities to elevate GAL globally. At present, most of our business is from the military sector. Today, we are working on expanding to the commercial sector, which we believe will make up an ideal business mix.

'GAL, which provides UAE Air Force comprehensive maintenance and logistics support for its fleet, offers complete solutions to its customers including aircraft modifications or upgrades, tip to tail management and supply chain support'

Leading Edge of Autonomous Tomorrow

Ali Al Yafei
Chief Executive Officer, ADASI

Committed to bringing the latest in cutting-edge drone technology and unmanned systems to the region and beyond, ADASI is at the forefront of innovation in autonomous capabilities and augmenting its product portfolio. They are open to expanding into South Asia and Africa when the right opportunity arises, says Ali Al Yafei, Chief Executive Officer, ADASI, in an interview. Excerpts:

Since joining in 2008, Ali has spearheaded significant growth and development of ADASI to enhance the UAE's national security infrastructure, and to address the nation's technological aspirations. Ali Al Yafei provides strategic oversight and business direction for the company, to ensure operational and productive efficiency in delivering complex programs for the UAE Armed Forces.

Countries all over the world are pushing for unmanned systems as the most important part of their defence strategy. How challenging is the unmanned systems industry today, and what makes ADASI a distinct player in the global arena?

UAVs are rapidly advancing in terms of capability and are growing in popularity, with an increasing number of uses across the military, commercial, scientific, recreational, agricultural, and other sectors. Drones have become critical to organisations and industries, increasing efficiencies, improving accuracy, and resolving security issues across borders. Their ability to reach the most remote areas with little manpower required saves time, energy, and cost.

The UAE drone market is expected to grow, driven by the rising demand for military and commercial drones, coupled with the proactive involvement of regulatory bodies, such as General Civil Aviation Authority (GCAA) and Dubai Civil Aviation Authority (DCAA), in devising policies to support the use of drones in different applications.

When it comes to UAVs and autonomous capabilities, ADASI is at the forefront of innovation and the upcoming launches at IDEX testifies this. With the future increasingly relying on unmanned systems that provide a higher degree of tactical flexibility, we have invested extensively to fast-track R&D investments in these domains, bringing related products to market with speed.

Incorporating the latest technologies, we focus on the acquisition, development, test, operation, and full-service support of UAV systems. We also modify and reconfigure performance to suit our partner's strategic and tactical demands or to integrate alternative payloads.

There are currently no platform systems like our Garmoosha drone in the UAE, which enables us to position ourselves on the leading edge of tomorrow. Our main competitors are based in China, USA, and Europe.

Could you give us an overview of the products and services offered by ADASI? Who are its major clients globally?

We have designed and manufactured the RW-24 system, a fully automated and highly effective high-speed UAV with significant offensive capabilities that operates from shallow to near-vertical angles and boasts a long mission endurance.

We also have more than 10 years of experience in operating and providing after-sales support for the Al SabrS-100 vertical take-off and landing (VTOL) systems– developing skills, training pilots, and deploying the UAVs in day-to-day operations, from systems and payload integration to maintenance and logistics. Today, our support is critical to keeping the Al Sabr UAVs in the air for over 5,000 hours a year.

Our Aerostat UAV is an advanced high-endurance airborne monitoring system that can carry an electro-optical/infrared (EO/IR) sensor, such as the FLIR U8500 or the WESCAM MX-10, to heights of up to 3,000 feet, and can stay deployed for over a week at a time, subject to local weather conditions.

Our GCS 300 shelter is the ideal base for transporting, storing, operating, and maintaining UAVs in the field. Robust,

resilient, and designed to operate in extreme temperatures, it can be transported by road, rail, sea, and air – including by C-130 and C-17 aircraft. On the ground, it expands into a full 6.1m x 5.8m technical and control hub with all the infrastructure and equipment needed for frontline drone operations.

Launched in February 2020, the Garmoosha drone is the first fully UAE-made high-performance vertical take-off and landing (VTOL) drone that is used to detect gas pipeline leaks, survey infrastructure, and conduct search and rescue operations.

The newest feather in our cap will finally be announced at IDEX. We are extremely proud to be expanding our product portfolio and remain committed to bringing the latest in cutting-edge drone technology and unmanned systems to the region and beyond.

While our primary customer is the General Headquarters (GHQ) of the UAE Armed Forces, we are working towards offering our products and services in other markets.

Tell us more about the Garmoosha drone. What makes the UAV an important asset?

The Garmoosha is a next-generation light unmanned aircraft system (UAS) designed to carry payloads up to 100kg. The platform has an endurance of six hours – equivalent to a range of 150km – and can perform across a diverse range of missions to meet defence and security force requirements, including intelligence, surveillance, and reconnaissance (ISR). It is deployable in all weather and light conditions, and at altitudes ranging from sea level to 10,000 feet.The aircraft's payload capacity and performance specifications give it wide functionality, making it an ideal platform for electronic warfare missions, radio link range extension and retransmission, maritime surveillance, monitoring, as well as search and rescue operations.

The Garmoosha meets market needs by enhancing air operations, and supporting various applications such as law enforcement, search and rescue, surveying, and securing borders. Its advanced capabilities, including an integrated high-definition camera and electro-optical sensor for day and night ISR collection, provide operational flexibility that allows militaries to save manned helicopters from critical missions.

Is ADASI considering expansion into the South Asian and African markets?

One of the main focuses of our parent company, EDGE Group, is to develop the country's export potential in response to international demands. With an operating model that focuses on building collaborative opportunities, we work with our partners to serve our shared interests wherever it makes business sense to do so, therefore we are open to expanding into South Asia and Africa when the right opportunity arises.

What are your visions and priorities for the company over the next decade? What is the roadmap ahead?

We have several product launches in the pipeline that are set to bolster ADASI's position as a regional leader in autonomous systems. In the long term, we aim to focus on the development of our core activities and strengthening the technological capabilities of our customers. We will continue to innovate, integrate, evolve, and develop our own unique intellectual property (IP) as we prepare for an increasingly autonomous tomorrow.

'The first fully UAE-made high-performance vertical take-off and landing drone Garmoosha is a next-generation light unmanned aircraft system designed to perform across a diverse range of missions to meet defence and security force requirements, including intelligence, surveillance, and reconnaissance. It is used to detect gas pipeline leaks, survey infrastructure, and conduct search and rescue operations as well.'

Sailing on Maritime Glory

David Massey
CEO, ADSB

With top-of-the-line shipbuilding and maintenance facilities, ADSB is a strategic national asset for the UAE, partnering with naval and maritime authorities in implementing vital security and defence missions, excelling in vesel new build, repair, maintenance, refit, conversion, sustainment, and refurbishment, as well as engineering consultancy and technology deployment. David Massey, CEO of ADSB, speaks about the wide range of their vessel design portfolio and maritime operations.

David Massey is CEO of ADSB, an EDGE entity that specialises in designing, building, and servicing of naval and commercial vessels. In this role, he is responsible for managing the overall operations of the company to maintain its position as strategic asset for the UAE and a commercially successful builder of warships and other vessels for the GCC region and beyond.

Over the last two and a half decades, ADSB has become one of the most experienced shipyards in the region specialising in the build and maintenance of naval and commercial vessels. Where does ADSB stand globally?

With a strong track record of operational excellence in naval capabilities, ADSB is the UAE's trusted naval defence partner and a strategic national asset for the UAE. It supplies quality vessels and provides ongoing through-life support to the UAE Navy and the Critical Infrastructure and Coastal Protection Authority (CICPA).

The company has also made a name for itself internationally as a provider of world-class shipbuilding and maintenance services, as its inclusion in several regional and global awards testifies. We have been finalists of the Seatrade Ship Repair Innovation Award, The Maritime Standard Innovation Award, The Maritime Standard Shipyard of the Year Award, and the Lloyd's List Shipyard of the Year Award.

However, we should be realistic that while ADSB is a significant player in the GCC region, it is not yet a global player. However, the company has over the last year both enhanced its in-house design capabilities and has also acquired design IP, and now has a portfolio of internationally competitive designs in the 11 metre to 44 metre range, of which some of the prototypes can been seen at NAVDEX.

ADSB uses the latest technologies to maximise fleet readiness, extend ship lifetimes, and lower overall lifecycle costs. Could you shed more light on its capabilities and state-of-the-art facilities?

We support naval and maritime authorities in implementing vital security and defence missions through vessel new build, repair, maintenance, refit, conversion, sustainment, and refurbishment, as well as engineering consultancy and technology deployment.

Our shipbuilding capabilities comprise the construction of highly complex vessels for navy and commercial customers. From fast interceptor boats to corvettes, our team has the know-how and technical background to build and service a wide range of vessels of all sizes.

In terms of facilities, we have a top-of-the-line main yard in Mussafah that spans more than 300,000m2. We also have a 2,000 tonne ship lift and can build up to 80 metres in length.

ADSB has built a series of special mission vessels for the Navy. Could you elaborate on your products and services in military shipbuilding?

ADSB builds and operates three main naval programmes – corvettes, offshore patrol vessels,and fast patrol boats/interceptors – including the region's largest naval shipbuilding programme for UAE Navy's six Baynunah-class corvettes and the Arialah offshore patrol vessels. We also build landing craft, special mission vessels, as well as other vessels for the luxury and VIP market.

Leveraging its shipbuilding and ship repair expertise, ADSB offers design, engineering, manufacturing, and implementation of all types of ship conversion projects. Could you share more details?

Working in close partnership with our clients, we can undertake everything from major repairs and conversions to the construction of modular units. In addition to mechanical and electrical refits work, and painting and blasting, ADSB is the leader in the region in complex combat systems integration. Combat systems now account for over half the whole life cost of a modern warship.

What are ADSB's commercial shipbuilding activities? Also, what are the latest updates on your Small Boat Construction division?

ADSB offers extensive commercial repair and maintenance services to the non-military market, primarily but not exclusively, to the oil services industry. As aforementioned, ADSB has in the past undertaken several luxury and VIP build and maintenance projects.

Our Small Boat Construction division manufactures landing craft, high-speed interceptors, patrol boats, RHIBS (rigid hulled inflatable boats) and other specialist vessels for customers from the GCC region and beyond. The division operates a 9,000m^2 state-of-the-art composite boat-building facility that can build and repair composite vessels up to 40m in length.

Did the COVID-19 pandemic affect ADSB's business? How did you overcome the challenges?

The pandemic interrupted land-based material supply chains due to border closures, and deliveries of combat systems parts from European suppliers during the lockdown.

However, a more serious challenge was the threat of rapid transmission of the virus among the 500+ members of our workforce who live onsite, in many cases sharing rooms. ADSB was one of the first companies in the UAE to implement a weekly mass testing regime for all its onsite staff, and severely restricted access to the site from outside, while the administrative staff worked remotely.

Measures to contain the virus involved designating multiple buildings as isolation facilities for those who tested positive, quarantine for those exposed, and separate facilities for those who tested negative or recovered. Staff members were moved, sometimes every few days, where necessary. With a healthy workforce largely in their 20s to 40s, only a very small number of those who tested positive required hospital treatment. Despite the impact on workforce availability, ADSB never closed down, and maintained support to its customers throughout the pandemic, working with staff members who tested negative.

As commercial customers tried to mitigate the effect of vessels being off-charter or not being used in oil service operations, they brought forward some maintenance activities. Owing to this unexpected outcome, ADSB's commercial repair and maintenance revenues for 2020 are significantly ahead of targets.

Although international movement restrictions impacted business development, we used this time to strengthen our design team and work on new projects. At IDEX, we are exhibiting the prototypes of several new vessels that have been completely designed and built by ADSB for the first time.

'ADSB builds and operates three main naval programmes – corvettes, offshore patrol vessels, and fast patrol boats/interceptors – including the region's largest naval shipbuilding programme for UAE Navy's six Baynunah-class corvettes and the Arialah offshore patrol vessels. They also build landing craft, special mission vessels, as well as other vessels for the luxury and VIP market'

Armoured Thrust

Fahad Al Absi
CEO, AL JASOOR

AL JASOOR's armoured vehicles are on the forefront of innovation and design, ensuring a distinct competitive advantage with their immense potential as a flexible fighting vehicle devised for future multi-terrain combat. Fahad Al Absi, Chief Executive Officer, AL JASOOR, speaks about a new generation of faster, more mobile, and more versatile vehicles with advanced offensive and defensive capabilities in this interview. Excerpts:

Fahad Al Absi is the Chief Executive Officer at AL JASOOR, an EDGE entity and the UAE's national specialist in armoured vehicles. In this role, he is responsible for developing and expanding national defense industry capabilities within medium to heavy armoured vehicles industry. Al Absi brings to his role 27 years of experience in national and multinational industries.

Armoured vehicles play a crucial role in ensuring the safety of those on the frontline, and new models with the latest defensive and offensive tech are emerging. Where does AL JASOOR stand globally in armoured vehicle manufacturing, and what are its major achievements?

AL JASOOR is the UAE's armoured vehicles specialist, the exclusive supplier of the Rabdan 8x8 infantry fighting vehicle (IFV), and a proud partner of the UAE Armed Forces. The company leverages advanced technologies and innovations to build highly mobile and versatile vehicles that provide guaranteed protection to those on the frontlines through enhanced ground force capability and tactical flexibility.

Could you tell us more about your Rabdan 8x8 vehicle and its capabilities?

The Rabdan is a next-generation amphibious armoured vehicle that offers unique operational, tactical, and technical advantages on land and water.The advanced, mission-ready vehicle, built for a range of objectives and terrain styles, is available in several configurations with a maximum capacity of 11 troops and a top speed of 100km/h. Providing Level 4 ballistic and mine protection, it can be equipped with different types of exterior armour and a high-calibre turret-based weapon system.

Rabdan 8X8 has been developed and tested to the most rigorous military standards, the Rabdancaters to the operational requirements of Armed Forces around the world. Supplied as a complete built unit, the vehicle features a modular multi-wheeled structure, and comes with a dedicated long-term package of military-grade integrated logistics support services.

In addition, it has a significant technology and systems development potential in the years to come.

What are the key aspects of this package of services?

The package includes on site client acceptance support, repair, refurbishment, preventive maintenance, 20-year supply of spare parts, special tools, technical support, local retrofitting, customisation to meet a range of mission objectives, as well as operational and maintenance training and know-how.

Is AL JASOOR considering South Asia and Africa as target markets for expanding its business?

With defence modernisation programmes accelerating globally, including the replacement of ageing vehicle fleets, the demand for 8x8 vehicles is growing rapidly. AL JASOOR is very keen to use this opportunity to enter the wider Middle East and Asia markets.

The Indian army is proceeding with the modernisation of its armoured vehicle fleet. What could AL JASOOR offer the country in this context?

The battlefield of the future presents a diverse and complex environment with

increasingly challenging combat scenarios. This demands a new generation of land vehicles that can provide swift insights and intelligence, flexible planning, and responsive tactics.

The safety and survivability of soldiers is a top priority for any military, and AL JASOOR ensures that those on the front lines are protected by a new generation of faster, more mobile, and more versatile vehicles with advanced offensive and defensive capabilities. AL JASOOR's military vehicles are on the forefront of innovation and design, and offers customers a distinct competitive advantage.With its powerful combination of performance and value, the Rabdan has an immense potential as a flexible fighting vehicle designed for future multi-terrain combat.

In addition, the Indian army could benefit from our R&D capabilities that play an important role in ensuring frontline survivability. We leverage modern testing techniques, battlefield intelligence, and cutting-edge technology tools to develop platforms that support mission success and occupant protection while anticipating existing and future threats. Our R&D involves direct interaction with our customers so that we can better understand their requirements for armoured vehicles and the potential needs of their occupants.

Could you shed some light on your production facilities with a focus on design, use of advanced technologies, quality assurance, etc.?

We have a dedicated team of engineers and technicians specialising in the heavy vehicles industry (HVI). All Rabdan vehicles are inspected to the highest international standards through our onsite testing and acceptance processes.

We incorporate the latest technological innovations, including artificial intelligence (AI) and survivability equipment, into engineering disciplines that are crucial to the armoured vehicle manufacturing process, such as electrical and mechanical engineering. AI offers significant benefits to the armoured vehicles segment. The speed with which AI-enabled sensors, computers, and targeting systems process and analyse information is growing at an unprecedented pace, supporting ever-increasing degrees of autonomy.

"Rabdan 8X8 is a next-generation amphibious armoured vehicle that offers unique operational, tactical, and technical advantages on land and water. It caters to the operational requirements of Armed Forces around the world. Supplied as a complete built unit, the vehicle features a modular multi-wheeled structure, and comes with a dedicated long-term package of military-grade integrated logistics support services"

Boosting Lifecycle Solutions

Abdulqadir Ali Al Ali
CEO, AL TAIF

Abdulqadir Ali Al Ali is Chief Executive Officer of AL TAIF, a subsidiary of EDGE that specialises in the maintenance, repair, and overhaul (MRO) of military armoured vehicles and ground support machinery. Al Ali is playing a dynamic role in shaping and steering the strategic direction of AL TAIF Company and implementing the company's vision and mission.

AL TAIF, a strategic partner of the UAE Armed Forces responsible for the maintenance, support and technical readiness of all its tracked and wheeled vehicles, provides comprehensive lifecycle support, engineering solutions, upgrades, modernisation, and technology integration across a wide range of defence platforms and systems. Abdulqadir Ali Al Ali, Chief Executive Officer, AL TAIF, speaks about their vision, to be the premier Centre of Excellence for comprehensive lifecycle support for defence systems in the MENA region and beyond. Excerpts from the interview:

MRO services are crucial for extending the lifecycle of land platforms, heavy utility vehicles, and ground support equipment. How successful has AL TAIF been in achieving its mission of supporting the operational readiness of land platforms?

AL TAIF has more than 14 years of experience in comprehensive lifecycle support and precision training solutions in Land MRO. The company combines local and international expertise, sector-specific knowledge and an ability to offer multi-platform support to deliver end-to-end solutions. We provide complex, extensive, and premium-quality maintenance services across a comprehensive portfolio, delivered against rigorous timelines in order to maximise asset availability.

Our customers and industry OEM partners trust us to optimise performance on all products and provide critical lifecycle services, enabling the Armed Forcesto focus on their mission priorities.

Our technical training capabilities complement our offering by equipping operators with an in-depth understanding of legacy and new technologies. We have highly skilled and experienced technical training staff that use innovative teaching methods, such as augmented reality, to help our clients to achieve mission readiness.

In addition, our supply chain management team provides a range of services, including warehousing, inventory management and procurement.We leverage big data and analytics to develop the most effective maintenance forecasts and schedules.

Could you share with us some of the major milestones in AL TAIF's success journey over the last one and half decade?

Our most significant milestone has been becoming a strategic partner of the UAE Armed Forces responsible for the maintenance, support, and technical readiness of all its tracked and wheeled vehicles.

We are also proud of our growing list of international technical certifications that govern our MRO processes and help us maintain the highest quality levels. These include ISO 9001, ISO 14001, ISO 1725, and 45001.

What are the services and facilities offered by the MRO division of AL TAIF for the military sector? Could you elaborate on the advanced technologies and platforms used?

Through our nine state-of-the-art facilities, strategically located for agility and flexibility, we can address all types of lifecycle support requirements quickly and efficiently.

Our MRO services includes, repair, rebuild and overhauling to be executed on a variety of wheeled and tracked vehicle platforms for the UAE Armed Forces. Capabilities include:machining of engines;electronics and electrical repair of vehicles and components; rebuild of components, such as engine transmission and differentials; vehicle and component upgrade; component refurbishment;and

interior and exterior bodywork, painting, and welding.We specialise in heavy and light vehicles,equipment,and small arms.

This life cycle is managed through an integrated ERP system to manage and control the company's daily routines that include work orders and demand management, supply chain and procurement, human capital and more. The system is utilised for business intelligence, optimum resource management, efficiencies, MRP and financial control to ensure the continuity of best-in-class services and development.

AL TAIF provides engineering solutions, upgrades, modernisation, and technology integration across a wide range of defence platforms and systems. Could you tell us more about your engineering division?

Our engineering division comprises a materials testing laboratory, a calibration laboratory, and a fabrication workshop.

Operated according to global best practices, our materials testing laboratory conducts critical assessment of parts and components in areas such as material composition and structure against specified criteria and intended application. Its services include failure analysis, spectroscopy, metallographic examination, non-destructive testing (NDT), oil analysis, polymer identification and thermal analysis, and corrosion tests.

Meanwhile, our state-of-the-art calibration laboratory provides a superior level of assurance in the quality of our work.

We also run a dedicated workshop to fabricate customised products and parts using materials such as mild steel, aluminium, stainless steel, and brass. The facility has five main areas: machining, sheet metal work, welding, vehicle modification, and foundry.

What are your visions and priorities for the company over the next one decade? What is the roadmap ahead?

We have big plans for AL TAIF in the coming years. Our vision is to be the premier Centre of Excellence for comprehensive lifecycle support for defence systems in the MENA region and beyond.

Ultimately, our aim is to accelerate our technological development, become a one-stop-shop for business integration, and remain at the forefront of advanced technology solutions.

> **AL TAIF aims to accelerate technological development, become a one-stop-shop for business integration, and remain at the forefront of advanced technology solutions in Land MRO**

Setting Benchmark for Pilot Training

Hareb Thani Hareb Al Dhaheri
CEO, HORIZON

With state-of-the-art facilities and a multinational team of experienced instructors, HORIZON, the premier flight academy in the Middle East, offers international-standard and bespoke rotary wing training to commercial and military aviators. Hareb Thani Hareb Al Dhaheri, Chief Executive Officer, HORIZON International Flight Academy, speaks about their futuristic goals and expansion plans. Excerpts from the interview:

Hareb Thani Hareb Al Dhaheri has been the Chief Executive Officer (CEO) at HORIZON International Flight Academy since 2011. As a retired Brigadier and Pilot with the UAE Armed Forces, he has amassed more than 30 years of experience in aviation and education. He started his career as a helicopter pilot in the UAE Armed Forces and went on to hold multiple senior positions in the military.

HORIZON is now the region's largest helicopter flight training academy. Could you shed some light on HORIZON's journey since its establishment in 2003, the run-up to establishing this company for training pilots locally and regionally?

For over 18 years, the company has trained and upskilled rotary wing pilots locally and regionally, playing a fundamental role in the development of aviation capability, while setting the benchmark for quality across the MENA region. Since our launch in 2003, we have grown to become the premier flight academy in the Middle East. We offer international-standard and bespoke rotary wing training to leading commercial and military operators. With state-of-the-art facilities and a multinational team of experienced instructors, HORIZON's basic and advanced training programmes are taught and delivered to the highest standards of safety, quality, and efficiency, in the industry.

What are HORIZON's state-of-the-art facilities and capabilities, for delivering training programmes? Could you also shed some light on various training courses the academy offers?

At HORIZON, we have a 10,000 sq. metre training facility located at Al Ain. Our classrooms are equipped with latest multimedia as we are now fully depending on multimedia training. We have four hangers equipped within our facilities, which can hold all our aircrafts for maintenance work and parking. We offer basic and advanced training courses for single and twin-engine helicopters for civilian and military purposes, including Qualified Military Pilot Bridge Course (QMP), Instrument Rating IR (H), Flight Instructor FI(H), and Commercial Pilot License CPL (H), Privet Pilot License (PPL), among others. In addition to the standard courses, Horizon offers specialised Night Vision Goggle (NVG), Multi-Crew Cooperation (MCC) courses and Air Transportation Pilot License (ATPL). Our comprehensive selection of international standard flight training courses is designed to cater for a range of students and skill levels. In addition to single and twin-engine helicopter training, we also provide a diverse array of aviation courses, which all offer a mix of practical and theoretical experience in flight safety, ground safety, aircraft accident investigation and management, aviation management, crew resource management, and management of flight safety and accident investigation.

More than 1500 pilots have already graduated from HORIZON. Could you give a detailed picture of the team and the international standards which are being followed?

Our multi-lingual trainers deliver theoretical and practical training, including flight and ground safety and accident investigation. Our advanced, industry-standard programmes train over 100 pilots every year and we are proud to help add to the UAE's pool of talent and boost the maturity of the local and international aviation industry, enabling them to earn nationally and internationally recognised qualifications. We have received a number of internationally recognised approvals and

certifications for our work, including ISO 9001: 2015. Our training courses comply with the European Union Aviation Safety Agency (EASA) standards and we are also officially approved by the UAE General Civil Aviation Authority (GCAA).

Are you developing more advanced courses for upskilling today's experienced pilots?

We ensure that we operate our training courses on the most modern of fleets, with the Bell 505, 407 and 429 all in service at our training academy in Al Ain, as well as four different state-of-the-art simulators. Bell helicopters are equipped with modern equipment such as the glass cockpit and Garmin function which enhances safety. The Garmin G1000H NXi avionics and dual channel FADEC (Full Authority Digital Engine Control) provide enhanced situational awareness. We also leverage the latest advanced technologies to ensure our training is cutting-edge, with computer-based training, multimedia classrooms, iPad technology, glass cockpit helicopters. We recently added two twin-engine helicopters for the advanced courses such as flying over water, over mountain and for search and rescue missions. In addition, we provide Night Vision Goggles (NVG) flying, which enables the pilot to fly at night. This allows students to complete single engine training and then without a break do advanced training on twin-engine helicopter.

We are continuing to set the benchmark for pilot training worldwide by guiding tomorrow's aviators and upskilling today's experienced pilots. We are developing more advanced courses, expanding our single and twin-engine helicopter training programmes, and bringing in the latest high-tech simulators to meet the growing demands of our industry.

What are the expansion plans and priorities in the near future?

We started our expansion plans three years ago. We introduced a new fleet, the Bell 505. We have also expanded by adding helipads to our tarmac to accommodate up to 18 helicopters at a time. Our immediate goal is to obtain a full Approved Training Organisation (ATO) certification from GCC countries and to shape Horizon Academy into a one-stop-shop for all aviation training needs.

What are the measures initiated by HORIZON to overcome the pandemic effect and to continue train a new generation of world-class pilots?

Horizon is actively adapting despite the current challenges. Our Distance Learning System and other online learning tools have been upgraded to take in and continue the theoretical portion of our pilot education programs, thereby allowing our students to attend classes from home.

> **'HORIZON ACADEMY's immediate goal is to obtain a full Approved Training Organisation (ATO) certification from GCC countries and to shape the Academy into a one-stop-shop for all aviation training needs'**

Stunning Pyrotechnics

Mohamad Al Falasi
CEO, APT

Mohamad Al Falasi, the CEO of APT is responsible for providing strategic leadership for APT, and has over two decades of experience in business management, particularly in the fields of weapons, ammunition manufacturing, project management, training and R&D. He has held several senior positions throughout his career and has been successful in establishing effective working teams and systems. Prior to joining APT, Mohamad was the Head of the Licensing Division at the Ministry of Defence.

APT produces high-performance non-lethal pyrotechnics and low-velocity ammunition for the defence and security sector. Mohamad Al Falasi, CEO of APT, highlights innovative solutions and tactical assets that are ideally suited to operations on the battlefield and in civilian settings. Excerpts from the interview:

With world class pyrotechnics manufacturing facilities, APT is now a leading manufacturer of high-performance non-lethal pyrotechnics and low-velocity ammunition for the defence and security sector. Could you take us through your success journey and major achievements?

A leading regional manufacturer established in 2016, APT produces high-performance pyrotechnics and low-velocity ammunition at its advanced manufacturing facility in the Tawazun Industrial Park (TIP) in Abu Dhabi. The military-grade testing and manufacturing process is driven by a deep understanding of the environments and scenarios where these tactical assets are needed the most.

APT's key customers include the UAE Armed Forces, Critical Infrastructure and Coastal Protection Authority, Abu Dhabi Police, Sharjah Police and Dubai Police. With an ultimate mission of supporting safety and security, APT delivers innovative solutions that are ideally suited to operations on the battlefield or in civilian settings.

APT makes use of high-grade pyrotechnic technologies to manufacture high-performing products. Could you give us a detailed picture about APT's products including smoke grenades and projectiles for signalling?

Flagship APT products include a range of hand grenades, thunderflash, signal cartridges and sound and flash grenades– designed for use by military, special forces, law enforcement and rescue teams – which feature either incapacitating sound and light capabilities, signalling and coloured smoke and irritants for a wide range of applications.

To go one step further in meeting customer requirements, APT has been developing hybrid products comprised of several effects embodied within one product, such as sound & flash and CS smoke, sound & flash and CS powder dispersion, sound &flash and colour smoke products.

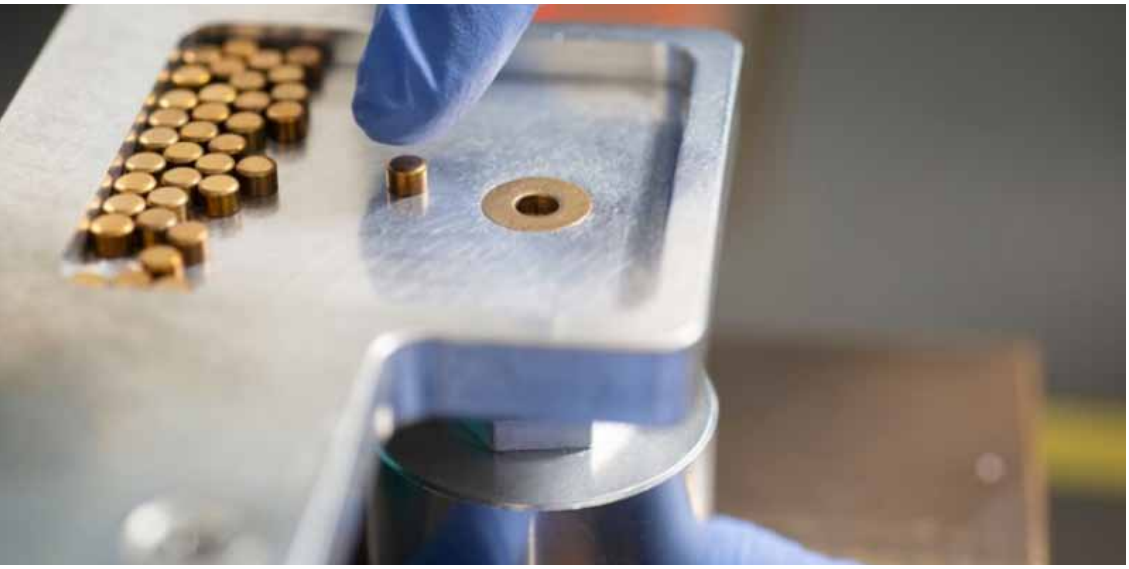
As with all APT's products, these are flexible and dependable – with the density, speed of deployment, and burning duration of the smoke cloud all fully adjustable. Furthermore, the smoke colours are comprised of organic dyes meaning the grenades are environmentally friendly, with protected aluminium packaging ensuring a long shelf life.

Over the years APT has developed technical and technological capabilities to produce advanced pyrotechnics for the region's armed forces and security agencies. How competitive is the sector and where does APT stand among the players?

Competition is a part of any business, and APT differentiates itself from the competition by focusing more on what the customer wants and their primary needs as we are more flexible and innovative in our approach. We strive to build on our current capabilities to extend our product offering and remain flexible enough to accommodate different requirements from various customers.

What are the standards APT has adopted to ensure the safety of operations and the sophistication of facilities?

APT's focus is on building positive, long-term and sustainable relationships with customers, with products fully customisable to meet the needs of specific operations. The company has adopted military standards and German technology specifications in accordance with international regulations



and is registered with the NATO Codification Bureau.

APT has recently been certified with the Quality Management System ISO 9001: 2015. The company has approved Occupational Safety and Health Management System from Abu Dhabi Occupational Safety and Health Centre (OSHAD) as a mandatory statutory (legal) requirement.APT is also reporting to IDB (sector regulatory authority) HSE department directly.

There is an established industrial base to support more complicated systems and subsidiaries within the EDGE Group to which APT belongs, which are keen to collaborate in providing services such as testing facilities and laboratories.

APT has support services designed to offer expertise to the whole industry, from training new recruits to partnering with other leading defence manufacturers. Could you elaborate on these support services?

APT is a company within the Weapons and Missiles cluster of EDGE, an advanced UAE-based technology group for defence and beyond that ranks among the top 25 military suppliers in the world. APT products are reliable, easy to use and affords safe handling since clear operating instructions are provided with the products to customers. APT offers any additional training customers may need.

As realistic training is required for operational readiness, you need to expose trainees to realistic but safe imitations of explosions. What type of support does APT provide in this area?

APT supports training in terms of operational usage and technical information requirements. Operational training is simulated with a realistic approach by providing electric smoke grenades with sound simulation (one of the latest products used by law enforcement training in Germany).

The COVID-19 pandemic has affected industries across the globe. How did APT brace for the impact of the pandemic? What are the post Covid-19 plans?

The ongoing pandemic has created a challenging operating environment for most commercial companies around the world, and APT and its parent company, EDGE Group, are no different. We are fortunate to enjoy deep and trusted relationships with our customers and key suppliers and this lends itself to an attitude of confronting the challenges together. APT's executive leadership has also been proactive in foreseeing the potential effects of the economic slowdown prompted by the pandemic, and have acted accordingly. The safety of staff, partners and customers has been of the highest priority in APT's internal approach to mitigating the effects of the virus.

> **APT has adopted military standards and German technology specifications in accordance with international regulations and is registered with the NATO Codification Bureau**

Redefining Smarter Ammunitions

Arafat Al Yafei
CEO, LAHAB

LAHAB has the region's most advanced and diverse manufacturing, assembly and integration capabilities for a wide product range that includes small, medium and large calibre ammunition for infantry, artillery and aircraft, and it serves regional armed forces and law enforcement agencies, as well as industrial customers that require ammunition testing and technical support services. Arafat Al Yafei, CEO of LAHAB speaks about emerging technologies and smarter ammunition designs. Excerpts from the interview:

Arafat Al Yafei is responsible for overseeing the manufacturing of all ranges of ammunition from small arm and infantry to artillery and aircraft. He is also responsible for leading the deployment of cutting-edge technologies and the enhancement of in-country manufacturing capabilities. Arafat possesses extensive experience in the deployment, development and distribution of ammunition to fulfil the demands of the UAE Armed Forces, along with regional partners.
Prior to joining LAHAB, formerly known as Barij Munitions, Arafat served as the CEO of Abu Dhabi Carbon Capture Company, a joint venture between ADNOC and Masdar, where he led the establishment of the first commercial carbon capture and utilisation project in the Middle East.

LAHAB began its operations in 1994 with small arms manufacturing and launched production of medium and large calibre weapons in 2008. Having more than 25 years of experience in defence and security sectors, could you give a detailed picture of the company's close association with militaries, law enforcement agencies and sports clients during these years?

LAHAB's portfolio features small-calibre arms ranging from the 5.56x45 mm to 12.7x99 NATO as well as shotgun ammunition for sporting, hunting and special applications, including law enforcement, right through to medium- and large-calibre weapons ranging from 40 mm grenades to 122 mm artillery rockets, and MK series GP serial bombs.

Our high-end manufacturing and assembly facility enables us to maintain agility and flexibility in responding to client needs, and quickly customise products for mission-specific requirements. Our advanced manufacturing capabilities are complemented by comprehensive testing and technical support services, providing continuous expert support throughout the munition's lifecycle – from assembly to decommissioning through our demilitarisation services for almost all types of explosives and pyrotechnics.

As leading munitions manufacturer meeting international quality and security standards, could you give us an overview of the products and services offered by LAHAB? Who all are the major clients globally?

At LAHAB, our manufacturing, assembly and integration capabilities are among the region's most diverse and efficient. Our product range includes small,medium and large calibre ammunition (5.56 x 45mm, 7.62 x 51mm, 9 x 19mm, 12.7 x 99mm, .308 WIN and .223 REM, grenades, mortars, artillery ammunition, aircraft bombs) ammunition. LAHAB also has the capability to perform the Service Life Surveillance (SLS) programme for all munitions types to support the UAE military. We additionally offer complete explosive and ammunition end-of-life demilitarisation for almost all types of explosives and pyrotechnics, featuring disassembly, separation and incineration using on-site safe demilitarisation that is monitored by government authorities to ensure our compliance and fulfil our commitment to the environment. LAHAB also disposes of commercial mining, oil, and gas products.

Even while harnessing the latest technologies and advanced manufacturing capabilities, have you been able to develop your own intellectual property and technology to meet the customers' evolving requirements?

With our research and development capabilities we have developed and licensed our own intellectual properties. Our Continuous Improvement Programme is focused on adopting cutting-edge technology advances that include process

optimisation and high-precision tools.

Being a supplier to regional armed forces and law enforcement agencies, what are the international standards and specifications followed by LAHAB to ensure quality and safety for the end user?

To ensure our products' compliance and adaptability in the international weapon systems we follow international standards such as the NATO standards and others. Also, we always ensure our products will work on our clients' weapons by providing proper certificates.

Could you elaborate on LAHAB's 'Continuous Improvement Programme', which is intended to adopt cutting-edge technologies including process optimisation and robotics production using high-precision tools?

Emerging technologies and smarter ammunition designs are part of the DNA of the LAHAB research & development team, which drives our Continuous Improvement Programme. Our state-of-the art x-ray inspection lab provides advanced testing capabilities – making it one of the most effective non-destructive testing (NDT) facilities available in the region to assure product completeness and quality.

Given LAHAB's experience and expertise,its production lines continue to evolve to meet the quick advancement of technology. We adapt our strategy to ensure the safety and security of our employees and facilities.

We are also committed to adapting to market changes, particularly in integrating technologies. LAHAB acquires, adopts, and implements cutting-edge technologies – not only in terms of products, but also within the manufacturing process. We ensure that we meet the changing requirements of our customers.

With advanced manufacturing capabilities complemented by comprehensive testing and surveillance programmes, how does LAHAB look at South Asia and Africa as markets for expanding its business?

LAHAB currently serves both regional armed forces and law enforcement agencies, as well as industrial customers that require ammunition testing and technical support services. We are seeking to become the default supplier of ammunition for the UAE and region. We are currently looking to export our products internationally, considering them most suitable for markets in the GCC, South Asia and Africa. We are always open to explore potential areas for collaboration in significant markets around the world.

The defence industry across the world is bearing the brunt of Covid-19 pandemic. What are the measures taken by LAHAB to overcome the pandemic effect and what are the post Covid-19 plans?

The ongoing pandemic has created a challenging operating environment for most commercial companies around the world, and LAHAB and its parent company, EDGE Group, are no different. We are fortunate to enjoy deep and trusted relationships with our customers, so there is an attitude of confronting the challenges together. LAHAB's executive leadership has also been proactive in foreseeing the potential effects of the economic slowdown prompted by the pandemic, and have acted accordingly. The safety of staff, partners and customers has been of the highest priority to LAHAB's internal approach to mitigating the effects of the virus. ■

'While seeking to become the default supplier of ammunition for the UAE and region, LAHAB is exploring potential areas for collaboration in significant markets around the world, especially in the GCC, South Asia and Africa'

Hitting the Bull's Eye

Manuel Wipf
CEO REMAYA

Manuel is a defence specialist and former member of the Swiss Army, with nearly three decades of international experience across the USA, Europe, Asia and the Middle East. His capabilities have played a key role in establishing REMAYA as a leading entity in the local shooting and defence training industry and have led to the successful foundation of multiple defence organisations across the world. In his role as the CEO, Manuel oversees several critical functions and departments across the company and is committed to developing its core competencies while maximising avenues for commercial success.

A global leader in creating and delivering military-grade shooting ranges and imparting live fire training, REMAYA offers a variety of complete turnkey solutions and complex systems. Manuel Wipf, CEO of REMAYA, speaks about designing and developing bespoke, custom-built live fire training centres using the latest virtual reality technologies, cutting-edge live fire target systems, robotics and simulation systems. Excerpts from the interview:

A key player in the Missiles & Weapons Cluster at EDGE since its inception in 2009, REMAYA has been creating and delivering military-grade shooting ranges and imparting live fire training for defence forces, corporations, NGOs, and nations worldwide. How challenging has been the road to success?

Our belief in offering the best facilities available has been a positive guiding proposition. REMAYA's core capabilities comprise providing military training facility design and development, project management, shaping policy, building live-fire target systems, video simulation, range operations and maintenance. The company's programmes focus on providing facilities where armed personnel can train for the future battlefield given evolving threat profile.

Could you give a detailed picture of REMAYA's products and services like range and training area design and construction and live fire target systems supply and installation?

We create and deliver world-class military grade shooting ranges from the initial design and development stages right through to operations and management and impart live-fire training to organisations serving and enhancing the skills of defence forces.

Our REMAYA Training Centre (RTC) provides training in a realistic location and under appropriate climatic conditions, using the latest customisable targetry systems and range management software.

We provide a realistic environment for our clients to train and certify their defence and security forces from around the world at our purpose-built live fire training facility, the REMAYA Training Centre in Al Ain. We also host numerous local and international certification programmes from the UAE's Military Qualification Authority, the US state department certified WPS (World Protection Services) program,US DOD SSS (Security Support services), Mission Support, Defensive Driving, Close Protection and Close Quarters Combat (CQC) training, and HEAT (Hostile Environment Awareness Training) and official certification for range personnel.

We also operate an unrivalled 3,000 square metre R&D workshop in the Tawazun Industrial Park in Abu Dhabi, from where we develop innovative solutions to continue improving the training experience at our facilities.

How important is firearms training and live fire facilities in a volatile world? Could you shed some light on the latest advanced technologies that REMAYA has harnessed to provide security forces the training and facilities required to be more flexible and responsive?

With the constantly changing spectrum of threats around the world, defence forces today need to be more flexible and responsive than ever. They must be ready for any challenge an operation might throw at them.

In addition to industry-leading facilities, at the heart of REMAYA's approach to facilitating training are more than 120 trained engineers and technicians working

to create custom live-fire range environments. These experts collaborate with clients to analyse training methods and understand missions and goals before implementing 21st century technologies that incorporate cutting-edge approaches to support modern training within a safe environment.

Strongly into building 21st century shooting ranges, who all are REMAYA's major clients? What are the business prospects in the South Asian and African markets for the business?

REMAYA provides services and support to defence forces, corporations, NGOs, and nations worldwide with military-grade shooting ranges. Clients from South Asia and Africa remain important to us, and we are active in our desire to collaborate with vetted organisations from around the world.

Could you share with us REMAYA's in-house capabilities and other strengths in providing solutions and complex systems for live fire ranges, besides the custom-designed procedures to manage, operate and maintain shooting ranges?

We are a global leader in creating and delivering military-grade shooting ranges and imparting live fire training. Our success is based on the variety of complete turnkey solutions and complex systems for live fire ranges we offer, designed, and built specifically to meet the precise demands of our clients. Today, we design and develop bespoke, custom-built live fire training centres using the latest virtual reality (VR) technologies, alongside cutting-edge live fire target systems, robotics and simulation systems. We also manage, operate, and maintain shooting ranges using state-of-the-art range management software, based on our custom-designed procedures.

Our significant differentiators include our provision of complete turnkey solutions for military-grade shooting ranges; our integrated range VR imaging with customisable range management software for designing, operating and maintaining shooting ranges; as well as our smart robotics to simulate soft targets. We also provide a fully customisable training centre, adaptable to meet our customers' needs, and an international network of certified, accredited instructors and partners.

Did the Covid-19 pandemic affect REMAYA's business? How did you overcome the challenges?

The ongoing pandemic has created a challenging operating environment for most commercial companies around the world, and REMAYA and its parent company, EDGE Group, are no different. However, we utilised this situation to develop new and important add-ons to our proposition, including the construction of residential facilitiesin our own training camp in Al Ain.

What is the roadmap ahead for REMAYA? What are the goals and objective you have set for the company?

We are focused on strengthening our capabilities and maintaining innovation, placing customer satisfaction at the heart of all our efforts to enhance our facilities, services, and products.

'REMAYA Training Centre in Al Ain is a purpose-built live fire training facility where a realistic environment is provided to train and certify defence and security forces from around the world'

Mission Safety

Talal Al Hashmi
Managing Director, ERS

As the exclusive provider of fire and rescue services to the UAE Air Force and Air Defence, ERS's services range from complete management and high-level consultancy, to the development and 24/7 operation of fire stations, vehicles and equipment, installation of fire detection systems, and emergency planning as well as firefighter recruitment and training. Talal Al Hashmi, Managing Director, ERS, tells us how it has evolved into a regional leader in fire and rescue. Excerpts from the interview:

Talal Al Hashmi is the Managing Director of ERS. In his role, he provides expertise and knowledge transfer to clients in the Defence, Government, Health, and Education sectors. As Managing Director, he oversees strategic and technical initiatives to provide firefighting services, such as 24/7 aviation emergency response services, internationally recognised fire and rescue training services, facility fire safety, and maintenance services for specialised firefighting vehicles and equipment.

Security services have become more sophisticated globally and emergency response has become increasingly critical. As a leading provider of integrated frontline fire and rescue services, how do you assess the present systems and technologies used in the industry? What are the challenges ahead?

As our cities become ever more integrated and advanced, and our security services more sophisticated, our region requires a world-class emergency response to keep pace. Training in fire inspections, pre-emergency planning, community risk assessment, and reporting on findings, is becoming increasingly critical to prevent loss of life, injuries, protect assets and maintain control over situations that could escalate in no time.

Because emergencies and disasters can strike at any moment the challenge for any emergency response provider in the future is to ensure more scientific methods of forecasting - in operational planning,as well as in engagement during emergencies and disasters.At ERS, we respond to that need through data gathering, analysis, pre-planning and regularly testing of the plans to provide reliable and effective fire and rescue services to the UAE Armed Forces.

Over the last one decade ERS has evolved as provider of comprehensive and turnkey solutions in fire and rescue services. What are some of your services and who are your clients?

Over the years, ERS has evolved into a regional leader in fire and rescue, working on behalf of major clients in the UAE's government, military and commercial sectors. Today, our substantial on ground presence and proven capabilities enable ERS to offer our clients in-depth strength and expertise through consistently applying industry best practices. As the exclusive provider of fire and rescue services to the UAE Air Force and Air Defence, ERS's services range from complete management and high-level consultancy, to the development and 24/7 operation of fire stations, vehicles and equipment, installation of fire detection systems, and emergency planning as well as firefighter recruitment and training. ERS presently provides services to the Joint Logistics Command which includes UAE Presidential Guard, UAE Air Force & Air Defence and UAE Joint Aviation Command.

What are the technical services offered by ERS to ensure the readiness of firefighting assets of the customers?

ERS offers comprehensive, integrated turnkey solutions, as well as specialist equipment and vehicles, facilities management, manpower,training and procurement – all conforming to the most stringent international standards. With a global reach that gives us access to a pool of multinational subject-matter experts, ERS consistently applies industry best practices to enable end-users to outsource

the emergency response function confidently.

The effectiveness of firefighting and rescue services partially depends on the efficiency of the personnel involved and ERS has been delivering comprehensive training and professional development programmes. Could you elaborate more on this?

ERS works relentlessly to ensure frontline fire safety for our clients.In addition to advanced technologies and best practices to save lives, world-class emergency firefighting and rescue services also depend on the effectiveness of the firefighters deployed. To ensure this, we provide comprehensive training and development for new and existing operational firefighters, in compliance with the latest International Civil Aviation Organization (ICAO) and National Fire Protection Association (NFPA) standards, across a range of exacting scenarios, conducted by a team of senior trainers with regional and international firefighting experience. This training includes hazardous materials response, domestic firefighting and fire officer training and development.

We also offer fire inspection and prevention training to help reduce the risk of fire. Our fire safety services are conducted in line with the UAE Fire and Life Safety Code of Practice and other internationally recognised benchmarks such as the NFPA. In addition, our fully qualified team of fire safety professionals can apply their direct experience of working with international organisations in ensuring compliance to these standards.

What goals and objectives have you set for the company in the coming years?

ERS is working to become an international centre of excellence for the provision of fire and rescue services in the short term.In the years to come, the company seeks to set benchmarks for emergency fire response in the UAE. One of our long-term development and engagement plans is to commit to enhance local expertise and meet Emiratisation targets, with the support of our regional and international talent.

ERS provides comprehensive training and development for operational firefighters, in compliance with the latest International Civil Aviation Organization (ICAO) and National Fire Protection Association (NFPA) standards, across a range of exacting scenarios.

Precision Tooling Hi-tech Solutions

Christian Ziehe
Acting CEO, EPI

Christian Ziehe is the Acting Chief Executive Officer (CEO) of EPI, an EDGE entity and regional leader in manufacturing high-quality complex engineering components for the defence, aerospace, and oil and gas sectors. In his role, Christian is tasked with enhancing the company's competitiveness through transfer of work from Europe, cycle time reduction, raw material and manufacturing process optimisation, and developing manufacturing synergies. Ziehe brings to his role over three decades of technical and managerial experience in the aerospace and defence industries across diverse business functions, including sales and marketing, research and design, quality management, procurement, logistics and production.

EPI, the engineering backbone of the UAE's aerospace and defence industry, manufactures high-quality complex metallic engineering components for the defence, aerospace, space, and oil and gas sectors at its advanced facilities in Abu Dhabi. Christian Ziehe, Acting CEO of EPI, speaks about their strategic partnerships with leading global players. Excerpts from the interview:

Since its inception in 2007, EPI has evolved into one of the GCC's premier precision engineering facilities for the aerospace, defence and oil and gas industries. What are the major milestones over these years and where does EPI stand globally?

We are proud to be known as the engineering backbone of the UAE's aerospace and defence industry. The company's core business is to provide design-specific metallic machined parts, surface treatment services and first level of assembly applications to customers within the aerospace, defence and oil and gas sectors. EPI's capabilities span engineering, production, surface and heat treatment, machining, coating, repairing and tooling.Over the years, we have been developing valuable strategic partnerships with established players across the globe-building our supply chain, our capabilities and expertise. In 2011, EPI became the first company in the Gulf region to achieve EN/AS9100 certification – the leading Quality Management System for the aerospace industry. Very recently, we formally announced that we are expanding our manufacturing capabilities to support the Boeing 787 Dreamliner. The serial assembly lines will be an extension to the current Abu Dhabi facility.

How does EPI look at South Asia and Africa as markets for expanding its business? What are the existing operations in these areas?

We are open to new partnerships from South Asia and Africa and remain focused on providing premium solutions to our partners.Most of our customer-base, 85%, is from the aerospace sector, with others from the defence, space, and oil and gas sectors. Our strategic partnerships with leading global players give us an edge over other enterprises. Working in partnership, round the world, we provide state-of-the-art engineering services to some of the world's most foremost aviation and defence original equipment manufacturers (OEMs) – such as Airbus, BAE Systems, Boeing, Dassault Aviation, Leonardo, Raytheon, SAAB and Steila Aerospace.

EPI recently announced its plans for expanding manufacturing capabilities for Boeing Dreamliner. What are the products and services offered by EPI in the aerospace industry? Who are the major clients?

EPI manufactures high-quality complex metallic engineering components for the defence, aerospace, space, and oil and gas sectors at its advanced facilities in Abu Dhabi. Last year EPI announced that it is expanding its manufacturing capabilities to support the Boeing 787 Dreamliner. EPI will machine parts for use in the 787-commercial aircraft. The processed parts will additionally go through EPI's surface treatment plant. EPI predominantly does precision machining but this collaboration with Boeing will help us move beyond machining and into aircraft parts assembly for aerospace Original Equipment Manufacturers (OEMs).Today, we also offer design enhancements and modifications. We provide expertise in every aspect of the manufacturing process, from initial designs to finished components, including build to print.Our capabilities include manufacturing, engineering, machining, surface and heat treatment, PVD coating, repairing oil and gas equipment and

components, cutting tools, assembly equipping and small assembly. As mentioned before, we work with world's foremost aviation and defence OEMs, including BAE Systems, Boeing, Dassault Aviation, Leonardo, Raytheon, SAAB and Steila Aerospace.

Providing round the clock engineering services to defence industry through state-of-the-art facilities has been a core objective of EPI. Could you shed more light onto the operations in the sector?

With advanced manufacturing facilities in Abu Dhabi, each of our solutions is calibrated to industry-specific standards and designed to meet international benchmarks.We provide expertise in every aspect of the manufacturing process and remain committed to incorporating advanced technologies into its engineering solutions. We have grown from an initial four machines to be able to offer an integrated suite of around 100 of the latest hi-tech machine tool systems.

Our Industrial Engineers and machine tools turn ideas into working prototypes, aided by a state-of-the-art measurement lab to guarantee accuracy. Approved prototypes are then made real with cutting-edge machinery: CNC milling, CNC turning, chemical processing, non-destructive testing, shot peening and blasting and heat treatments, PVD coating and plastic injection. Our highly skilled team of CAD/CAM designers, programmers, tool makers, application and manufacturing engineers apply next-generation technology to design and deliver 21st century engineering solutions.

We support product development from early-stage capacity studies and prototyping to final manufacturing and production process design. We also have capabilities in cutting tools, surface treatment, heat treatment, coating, repair, and machining.

The inspection, testing and laboratory facilities of EPI are top notch with the aim to meet international standards and customer needs. Could you talk more about EPI's inspection and quality assurance operations?

We make sure that all our products and manufacturing processes are constantly monitored and controlled to meet our internal and customer needs. That's why we focus on training our employees for operator qualifications and reassessment programmes. This helps us promote self- inspection deployments across departments.Our Statistical Process Control framework goes a step further by helping us improve sampling methods and redefines key characteristics required to ensure alignment with our Quality Policy.

We are equipped to control the properties of materials, including various aluminium grades, titanium, steel and stainless steel, to meet industry benchmarks. We achieve this through monitoring that includes incoming inspections, detailed inspection during the parts manufacturing stage, and review following heat-treatment processes. Our test capabilities include:

- Material surface hardness with machines capable of achieving Vickers, Knop, and Rockwell A, B, C methods
- Case-depth hardness (white layer) and microstructure analysis (including moulding)
- Chemical analysis with spark optical emission spectrometer (OES)
- Electrical conductivity measuring of non-ferrous material (aluminium grade/Eddy currents)

"EPI is now expanding its manufacturing capabilities to support the Boeing 787 Dreamliner while working in partnership round the world it provides state-of-the-art engineering services to the world's foremost aviation and defence OEMs, such as Airbus, BAE Systems, Dassault Aviation, Leonardo, Raytheon, SAAB and Steila Aerospace."

Russia unveils to the global market the new anti-stealth radar

Rosoboronexport (part of the Rostec State Corporation) in 2020 has started promoting the P-18-2 Prima high-mobility 2D surveillance and acquisition radar to the foreign market. Aero India 2021, that took place in February in Bangalore, India, became the foreign premiere of the system.

According to the company, the Prima solid-state radar is based on modern hardware components and digital signal processing and generation technology. It features high energy potential and increased immunity, points out the company. The radar is designed to detect, track, locate and identify air targets of various classes and types as friend or foe in both jamming and clutter environments, take the bearing of jammers, and feed radar data to users' automated command-and-control systems.

The P-18-2 is distinguished from most other radars available on the market by its high mobility achieved through the installation of all equipment and antenna post on one vehicle. At the same time, its crew consists of only two people who can operate both from the equipped cabin and remote workstations. The radar features a high level of automation and can be deployed and stowed within about 5 minutes.

The Prima radar operates in the VHF band and is capable of detecting any aircraft, including stealth ones. Its range coverage exceeds 320 km and elevation coverage is up to 45 deg. The minimum detection range is 500 meters. The developers have introduced a number of technology solutions to ensure the radar's operation in a jamming environment, difficult terrain and in adverse weather conditions. The radar automatically detects and tracks low-speed and low-visibility targets in a clutter environment.

The radar is equipped with advanced satellite navigation equipment exploiting GLONASS/GPS signals that provide automatic positioning. It has a built-in diesel power plant and a power take-off generator, and can also be connected to a three-phase general-purpose electrical network.

Another major product in the Russian radar portfolio is the Resonance-NE long-range low-observable aerial target acquisition radar. This VHF-band phased array radar is designed for effective long-range detection of a wide scope of existing and prospective flying objects such as low-observable cruise and ballistic missiles, as well as hypersonic aerial vehicles, including stealth ones, in contested electronic environment and under natural noise. The detection range reaches 1100 km.

Indian Navy, IIT ,Delhi sign MOU

Furthering the relationship between Indian Navy and IIT Delhi on research in underwater domain of Naval Electronic Systems, a Memorandum of Understanding has been signed. The relationship dates back to 1970s and key technologies for Navy in the field of underwater electronics have been developed by the Centre for Applied Research in Electronics (CARE) at IIT Delhi since then. The research carried out at IIT Delhi has played an important role in the technological advances made by the Indian Navy. In line with Prime Minister Modi's vision of 'Atmanirbhar Bharat', Indian Navy endeavours on development of major technology driven projects through IIT Delhi.

Sensor specialist HENSOLDT expands capacity

Sensor solution provider HENSOLDT is expanding its capacity to cater for the growth in its business. HENSOLDT is investing approximately 30 million euros at its Ulm site and creating an additional 300 jobs for highly skilled staff throughout the entire group this year, having taken on 250 new recruits in 2020. This investment is linked to strong order growth relating to the development of a new radar for the Eurofighter combat aircraft and other projects.

"In its three years of existence, HENSOLDT has strengthened its position in the global sensor solutions market," affirmed HENSOLDT CEO Thomas Müller. "We operate in the high-tech sensor technology arena – a growing segment characterised by very long-term planning."

The company is investing in the construction of a radio frequency technology development centre at the Ulm site, among other things. In addition to electronic components for the new Eurofighter radar, AI-based sensors for a wide range of applications will also be developed there.

Last year, the German parliament approved a budget of approximately 1.5 billion euros for the development of a new Eurofighter radar by a development consortium led by HENSOLDT. Other business units of the group are also showing strong growth, such as ground and naval radars, electronic warfare and avionics systems, and optronics equipment. For instance, HENSOLDT is working on future-oriented projects such as the German/French/Spanish Future Combat Air System (FCAS) and a UAV collision warning system. Recently, in 2020, HENSOLDT already hired 250 new employees, expanded its cleanroom production at its Oberkochen site by 300 m^2 and converted its radar production in Ulm to series production.

ABIMDE shows strenghth of Brazilian Defense Industry at IDEX

ABIMDE (Brazilian Association of Defense and Security Materials Industries) will be showcasing the capabilities of the Brazilian Defence Industry at the International Defense Exhibition And Conference (IDEX), one of the main defense events in the world, which will take place at Abu Dhabi.

The aim is to promote BIDS (Industrial Defense and Security Base) companies, strengthen ties with other countries and generate business for Brazil. ABIMDE associates: Atech, Avionics, CBC, Condor, Embraer, Gespi, Iacit, Kryptus, MacJee, M&K Logistics, Siatt and Taurus are participating in the exhibition.

"The coming years will be crucial for Brazilian companies that wish to obtain or expand space in the foreign market. That is why ABIMDE acts strongly in supporting BIDS companies. And IDEX is a golden opportunity for our companies to show their potential with partners from around the world, especially from the Middle East ", pondered the entity's president, Dr. Roberto Gallo.

Paulo Albuquerque, director of projects and institutional relations at ABIMDE, points out that the holding of the Brazilian Defense Day with the United Arab Emirates, in November last year, qualified the associates for the event in Abu Dhabi. "Our companies arrive stronger and more prepared at this event. In a highly competitive environment, they start at the front ".

IDEX 2021 will showcase the latest developments, technologies and innovations in the defense industry. In addition to supporting the development of the sector, the event establishes new relationships between large international companies.

IDEX is sponsored by Sheikh Khalifa Bin Zayed Al Nahyan, president of the United Arab Emirates and supreme commander of the country's Armed Forces. The event is organized by Capital Events in association and with the support of the Armed Forces of the United Arab Emirates.

The only international defense exhibition and conference confirmed in the MENA (Middle East and North Africa) region, IDEX is an important platform for those who want to establish and strengthen relationships with government departments, companies and armed forces across the region.

Kalashnikov group to present MP-155 Ultima, the first smart shotgun in Russia, at IDEX

The Kalashnikov group from Russia is presenting a new product for the civilian market – smart shotgun MP 155 Ultima at IDEX-2021.

MP 155 Ultima is the first smart shotgun in Russia. This shotgun is based on a proven and reliable classic MP-155 hunting shotgun with requests from modern customers in mind.

"You can compare market entry of Ultima in the firearms industry to a new iPhone entering the market of mobile phones. Our new smart shotgun has a futuristic design, can synchronize with gadgets and is aimed at people who cannot live without their smart devices. Nothing like that has ever appeared in the market," said Dmitry Tarasov, CEO of the Kalashnikov Group.

MP 155 Ultima has a modular design, which allows a customer to customize the shotgun for his needs. External parts of the shotgun are made out of B95T (7075) aluminum and high-strength polymers. The shotgun could be equipped with a camera that can record and live stream in Full HD, has a digital display with a clock, compass, stopwatch, shot counter, and round count indicator. The computer is located inside an adjustable stock.

Saab to Lead European Development of Detect and Avoid Capabilities for Remotely-Piloted Aircraft System

The European Commission has selected the EUDAAS (European Detect and Avoid System) consortium, with Saab as leading partner, to develop Detect and Avoid capability for large military Remotely-Piloted Aircraft Systems (RPAS) within the European Defence Industrial Development Programme.

The Grant Agreement, worth over €21 million, was signed on 1 December 2020.

"We are extremely pleased with this award; the European Defence Industrial Development Programme EUDAAS is a strategic program providing technological and operational value to us, our partners and military operators of RPAS. This success has been made possible thanks to the long history and collaboration of our company and partners working in this field, which we have the honour to lead," says Ann-Kristin Adolfsson, head of Business Development and Strategy at Saab business area Aeronautics.

The EUDAAS programme will develop and validate a 100% European Detect And Avoid (DAA) solution for safe insertion of large military Remotely-Piloted Aircraft Systems (RPAS) in European air traffic. The DAA system provide the remote pilot the ability to "see and avoid", including a fully automatic collision avoidance function which will initiate manoeuvres to avoid collision with other aircraft if necessary. The system is to be integrated into the air traffic management system as with manned aircraft.

"The technology brings the key piece of safety assurance to enable more autonomy and efficiency into aviation, enabling unmanned and remotely operated aircraft to take off in a broader sense. The technology ensures that unmanned and remotely operated aircraft will not collide with other aircraft. While the project focus is on military unmanned aircraft, the technology is fully applicable to also civil systems," says Ann-Kristin Adolfsson.

The programme also increases the maturity of non-cooperative sensors. The technology will be fully compliant with civil requirements, also supporting safe operation of civil Drones e.g. for services in support of deliveries, agriculture & forestry, environmental protection, border surveillance and Urban Air Mobility (UAM): a transportation system that move people by air.

The Detect and Avoid system developed will be tested on several unmanned platforms including the Medium-Altitude Long-Endurance RPAS (EuroMALE test platform) and Tactical Unmanned Aerial Vehicles (TUAV). The programme will run for three years and work closely with the civil developments in the field such as in the European Commission SESAR2020 programme, standardisation in EUROCAE and regulatory development with the European Aviation Safety Agency (EASA).

Ministries of Defence of the five participating EU Member States support the program. The participating countries are Sweden (lead nation), Italy, Germany, France and Spain. These nations will also provide funding to the programme, in addition to the European Commission Grant, which along with industry contribution will result in a +€30 million programme.

The consortium consists of the following members: Saab AB (Sweden, coordinator), Centro Italiano Richerche Aerospaziali CIRA S.C.P.A. (Italy), Diehl Defence GMBH & Co. KG (Germany), Deutches Zentrum für Luft- und Raumfahrt (Germany), Hensoldt Sensors GmbH (Germany), Indra Sistemas (Spain), Leonardo S.P.A. (Italy), Safran Electronics & Defense (France), Thales Six GTS France SAS (France), Onera (France) and Eurocontrol (Belgium). Additional participants include Thales AVS SAS (France) and Airbus Defence and Space GmbH (Germany).

Rheinmetall modernizing 27 more Boxer vehicles for the Bundeswehr

Rheinmetall is currently bringing another 27 Boxer command vehicles of the Bundeswehr up to the latest A2 standard. Germany's Federal Office for Bundeswehr Equipment, Information Technology, and In-Service Support (BAAINBw) awarded the order at the end of January 2021. The 27 vehicles are to undergo modernization at the Rheinmetall Landsysteme GmbH plant in Kassel, Rheinmetall's centre of excellence for tactical wheeled vehicles. Work is set to begin in March 2021, with return of the vehicles to the Bundeswehr slated to take place during the 2022-2024 timeframe. For Rheinmetall, the order is worth a figure in the lower two-digit million-euro range.

The command vehicle, or FüFz in German military parlance, is one of four variants of the tried-and-tested, high-mobility Boxer armoured transport vehicle currently in service with the Bundeswehr. The FüFz is found in mechanized formations, where it serves as a mobile tactical operations centre or command post. The vehicles feature a full panoply of radio equipment and advanced C4I systems.

The upgrade to A2 status encompasses an extensive array of modernization measures, including (among other things) the driver's visualization system; the exhaust emission and air-conditioning ducts; the towing gear; the driver's station; the headlight technology; as well as software and system security modifications. In addition, the vehicle's satellite communications capability, voice and data transmission and IT equipment will all be improved.

Now official, the latest order forms a sequel to the modernization to A2 status of the first lot of 38 Boxer command vehicles that commenced in 2017. The current combat performance upgrade of the second lot will ensure that the Bundeswehr's entire fleet of 65 Boxer command vehicles reflects the latest tactical and technical state of the art.

Russia's Typhoon vehicles join global MRAP market

Russian Remdizel company has developed a range of the highly protected wheeled armored Typhoon-K vehicles, encompassing 4×4 and 6×6 vehicles intended to integrated logistics support in various environments. The latest addition to the family is the brand-new Linza field ambulance vehicle, that was for the first time showcased abroad by Rosoborone□port at Aero India 2021 in Bangalore.

Typhoon–K vehicles provide a high-security level for the crew and cargo from small arms fire, from anti-tank and land mines. They can be reconfigured for various roles such as armored personnel carriers, armored ambulances, infantry combat vehicles, armored recovery vehicles.

The Typhoon K-63968 6X6 armored modular vehicle with a setting capacity of 3+14 persons and a curb weight of 22 t is especially designed for the dangerous combat missions. Independent suspension with hydro-pneumatic supports allows for an automatic and forced change of rigidity and ground clearance parameters, and ensured high travelling comfort and effective vibration damping. The tubeless tyres have an anti-mine insert and controlled pressure. Remdizel points out, that the Typhoon K-63968 chassis can serve as a base for mounting technological, engineering and special equipment and creating vehicles of various configurations.

The Typhoon K-53949 Linza armored filed ambulance vehicle enables the evacuation of up to six wounded from the battlefield. According to the official

Rheinmetall to supply cargo hold simulators for Airbus A400M

The German Air Force continues to count on Rheinmetall's cutting-edge simulation expertise for training its A400M Military transport aircraft personnel. In January 2021 the A400M's maker, Airbus, contracted with Rheinmetall Electronics to supply two additional training simulators for the European A400M. Earmarked for German air bases in Wunstorf and Altenstadt, the two simulators will be delivered and ready to operate by the end of 2022.

In Wunstorf, Air Transport Squadron 62 will receive an A400M Cargo Hold Part Task Trainer (CPTT). This will augment the A400M training centre's existing suite of simulation and training systems, which includes the advanced Cargo Hold Trainer Enhanced (CHT-E), used for training cargo hold crews, especially loadmasters and ground personnel.

Specially configured for the mission, a second CPTT will be installed at the Airmobile and Air Transport School in Altenstadt, where it will be used for training airfreight handling personnel and paratroopers. The CPTT will be the base's first A400M simulator.

The A400M CPTT is an exact full-scale replica of the A400M cargo hold, including the operator interfaces. It permits highly realistic training of cargo hold crews and ground personnel. Highly versatile, the CPPT enables mission-specific configuration of the cargo hold. Trainees can practise the preparation of cargo, loading and unloading, in-flight and ground procedures. The crew also learns to operate as a team. The system lends itself to initial and advanced training as well as refresher courses and mission preparation. Complex scenarios and emergency situations can be practiced in complete safety, since there is no need to use the original equipment, which therefore remains ready for real-world operations. All of this ensures that personnel are well-prepared and qualified to carry out their tasks. In addition to training operations, the CPPT lets users evaluate, test and qualify procedures and configurations for new types of loads. This is possible thanks to the CPTT's highly accurate replication of the original equipment.

Constituting a systematic expansion of Rheinmetall's line of cargo-related products, the CPTT also enables the complete spectrum of cargo training assets to be adapted for other platforms.

Besides the CPTT, Rheinmetall has supplied various A400M user nations with other types of cargo training equipment,

including the Loadmaster Workstation Trainer (LMWST), and the aforementioned CHT-E. Now official, the latest order brings to ten the total number of sophisticated, high-fidelity Rheinmetall A400M cargo training systems, assuring a high standard of instruction and training in the A400M cargo domain.

Rheinmetall supplied the first A400M CPTT to the Royal Malaysian Air Force in 2019. CHT-E simulators are now in service at the Airbus International Training Centre (ITC) in Seville; with the Royal Air Force in Brize Norton in the UK, the German Air Force in Wunstorf; and with a French Army airborne brigade near Toulouse. The LMWST is on hand at the Airbus ITC in Seville; France's national A400M training centre in Orléans; and at the Royal Air Force National Training Centre in Brize Norton.

information of the Russian MoD, the Army's vehicle is protected against all types of small arms, withstands an explosion of up to eight kilograms of TNT under the wheel. The wheels are also armored, and a vehicle with a damaged wheel can travel up to 50 km on rough terrain.

Various modifications of Typhoon-K vehicles are already being introduced into the Russian Armed Forces and offered at the global market by Rosoboronexport.

Among the weapon systems that can be fitted into Typhoon-K vehicles are various remote-controlled weapon stations (with both machinegun and artillery armament) and missile launchers. The 4×4 Typhoon-K with Kornet-EM long-range missile system was earlier demonstrated at the ARMY international military expo in Russia.

GRSE executes another Export Order: Delivers FPV to Govt. of Seychelles

"SCGS Zoroaster", a Fast Patrol Vessel (FPV) built by Garden Reach Shipbuilders and Engineers Limited (GRSE), Kolkata, a Mini Ratna Category 1 & leading shipyard of the country, was delivered to the Coast Guard of Seychelles, taking the count of warships delivered by GRSE to a record 107. Delivery of this ship signifies a breakthrough in the company's journey towards becoming a global player in the warship building arena and bears testimony to the trust; foreign countries are reposing in this Indian shipyard's abilities. Recently, GRSE also bagged an order for construction & supply of one Ocean Going Passenger & Cargo Vessel for Republic of Guyana.

The Protocol of delivery and acceptance was signed between Rear Admiral VK Saxena, IN (Retd.), Chairman & Managing Director, GRSE and Lt. Cdr Aditya, Commanding Officer (Desig) in the presence of Cmde Sanjeev Nayyar, IN (Retd), Director (Shipbuilding), Cmde P R Hari, Director (Personnel) and Shri RK Dash, Director (Finance) and other Senior Officials of GRSE, Indian Navy and Indian Coast Guard.

The SCG Ship 'Zoroaster', a Fast Patrol Vessel, is a powerful, fuel-efficient platform designed to perform multipurpose operations, such as patrolling, anti-smuggling, anti-poaching, and search and rescue (SAR). With a maximum speed of 34 knots and an endurance of more than 1500 nautical miles, this50 m FPV with a waterjet propulsion system and advanced controls has the capability to undertake Maritime Missions of the Seychelles Coast Guard. The ship is also fitted with a 40/60 gun as the main armament. The vessel will also flaunt improved habitability features with fully air-conditioned modular accommodation for 35 personnel. The overall design of the FPV has been developed in-house by GRSE.

GRSE also has the experience of delivering CGS Barracuda, a multipurpose compact Offshore Patrol Vessel to Mauritius Coast Guard, thereby becoming the first Indian shipyard to have exported a warship, way back in 2015, when the ship was commissioned.

Since its inception as a DPSU in 1960, GRSE has built 788 platforms which include 107 warships to Maritime forces, which is highest number of warships built & delivered by any shipyard in the country, till date.

GRSE has the capability to construct 20 ships concurrently, using its modernized infrastructure and 'Modular Integrated Construction Philosophy'. Further, the dedicated, multi-disciplinary, strong Design Team of the shipyard is continuously working towards developing various concept designs for ships that can cater to the current and future requirements of Indian Navy and Indian Coast Guard.

GRSE also has a dedicated Ship Repair facility, which is fully geared to undertake refits of ships. Apart from shipbuilding & ship repairs, GRSE has diversified into Engineering Business, with a product profile of Prefabricated Steel Bridges, various Deck Machinery Items such as Anchor Capstans, Boat Davits, Pumps etc & Assembly/ Testing/ Overhauling of MTU Diesel Engines.

Navantia to boost Shipbuilding Collaboration in Saudi Arabia

The Spanish shipbuilder Navantia and Zamil Shipyard have signed a Memorandum of Understanding for cooperation in future naval projects in the Kingdom.

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Navantia is one of the international defence companies with the largest product portfolio, ranging from surface ships and submarines to digital services. Its commitment towards the Kingdom's plan 'Vision 2030' has gone another step forward through specific agreements such as the Memorandum of Understanding (MoU) recently signed with Zamil Shipyard, a division of Zamil Offshore Service Company located in Dammam Port. This agreement is focused on collaboration in future naval shipbuilding programs in the Kingdom and in other areas such as ship repairs, conversions or sustainment.

Navantia has launched other initiatives in the Kingdom to boost industrial cooperation in the area of Combat System integration, a highly technological area for which Navantia created a Joint Venture with SAMI (Saudi Arabia Military Industries) to develop, integrate and market the first Saudi Combat System: HAZEM. The already fully operational company, called SAMI-Navantia, was awarded a significant contract in September 2019 for the supply and integration of the combat system of the five Avante 2200 corvettes currently under construction for the Royal Saudi Naval Forces.

SAMI Navantia employs more than 30 Saudi people. The Saudi engineers with direct participation in the Avante 2200 Corvettes project are deployed in Spain during the duration of the program and will become the backbone of the ship's support in the Kingdom. The capability and skills developed in the Avante program will benefit also the future naval projects of the Royal Saudi Naval Forces, as well as the international programs where both companies are already cooperating.

Additionally, Navantia is discussing cooperation with companies in the Kingdom aimed at achieving the necessary self-sufficiency in Maintenance, Repair and Overhaul (MRO) of vessels and the development of a solid shipbuilding ecosystem in Saudi Arabia.

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