African Security

ISSN 2547-9059

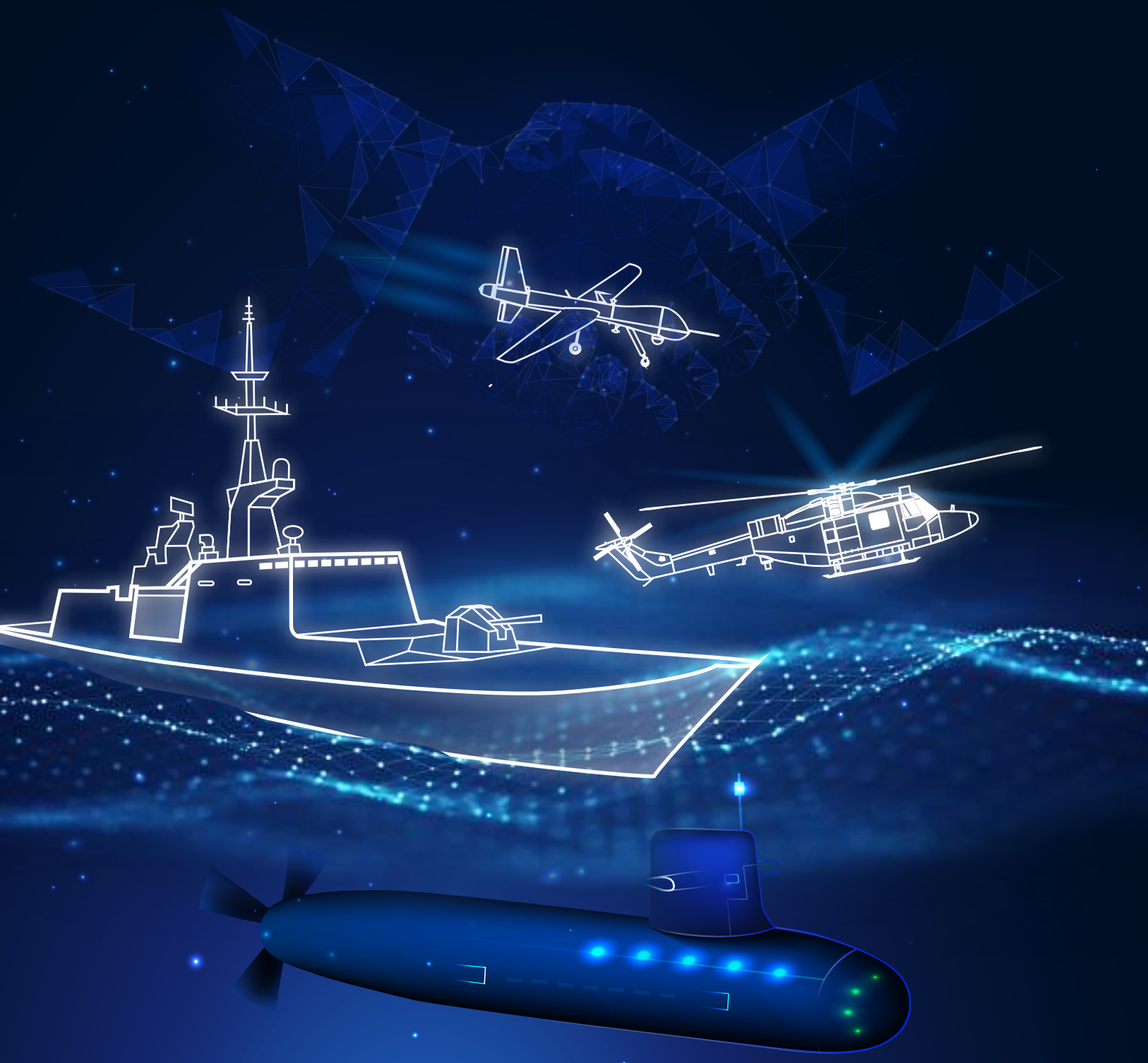
AFRICA'S BIMONTHLY DEFENCE, DEFENCE INDUSTRY AND SECURITY MAGAZINE

ISSUE: September – October 2022 VOL 9 No 9-10

Bonus Distribution

EURONAVAL

THE WORLD NAVAL DEFENCE EXHIBITION



28th edition

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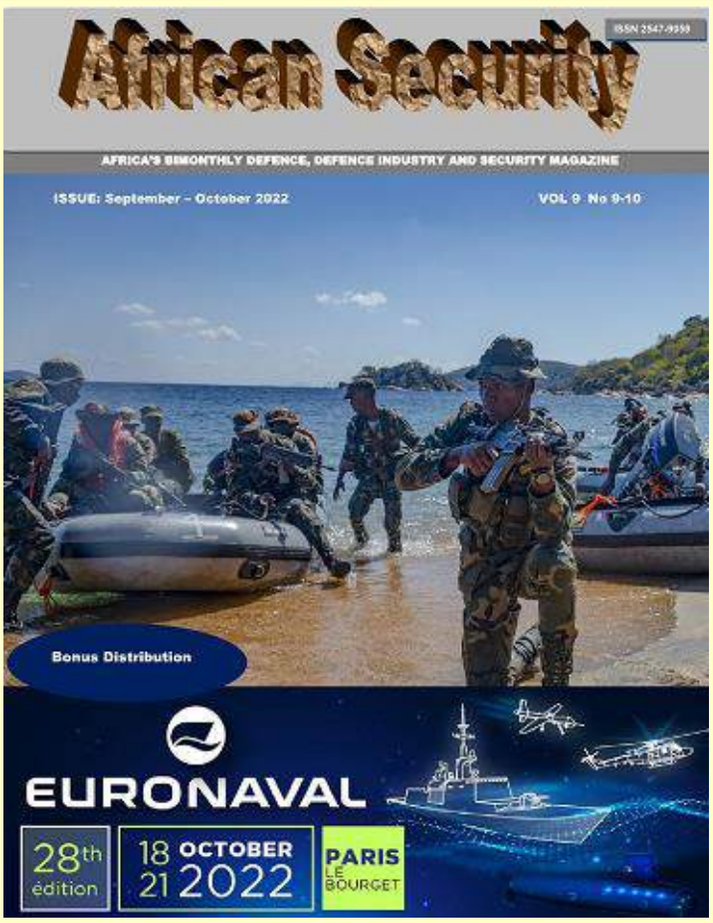

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AFRICAN SECURITY is an international tri-service bimonthly defence magazine, published by DBDC International Defence Publications & Events Ltd, covering security, defence and defence industrial issues in the African Continent. No material may be reproduced without the recent content of the editor.

Annual Subscription rate:
*__Print + Digital__ $120 (Air mail surcharge is included)
*__Digital__ $60

DBDC International Defence Publications & Events

DBDC INTERNATIONAL DEFENCE PUBLICATIONS & EVENTS UK LTD
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Patrol Boats for Low Enforcement Enhancing Maritime Security in Africa

Maritime Security Challenges

The global impact of piracy on the world is growing as the economic and social struggle turn to extreme measures to feed their families and make a stand against the vast wealth that is being gained from the oil and other resources in these seas. Also the impact of Illegal, Unreported and Unregulated fishing (IUU) is uncontrolled leading to fears that this will largely affect the African economy and populations on the coast line that are dependent on the fish *food*. The current economic situation in Africa restricts individual states from being able to effectively tackle the problem. Unclear definitions over territorial laws and a lack of better coordination between African nations has enabled piracy to escalate with ambiguities and ways to avoid conviction or capture.

Maritime security operations entail routine patrols to determine pattern of life in the maritime domain, enhance mariner-to-mariner relations and disrupt the transport of illicit cargo. Through persistent maritime security operations, costal nations show its commitment to enabling the free flow of commerce for legitimate traffic as well as to contest the battle space in all areas where the transport of illicit cargo is used to fund and/or arm terrorism and other unlawful activities is paramount.

The piracy problem in East and West Africa received global attention in 2007 and stimulated interest in African maritime security challenges. Following a dramatic increase in the number of hijackings, international and regional actors established a large and focused framework for cooperation.

The African states are already working to come to grips with the maritime security challenges. Together, they have developed maritime strategies that serve as platforms for the employment of military, political, and economic measures. More can be done to minimize the risks against international and African maritime interests.

Global Patrol Boat Market

Global patrol boat market is primarily driven by high adoption of various types of patrol boats across the globe. A patrol boat is referred to as patrol ship, patrol craft, or patrol vessel is a relatively small naval vessel. This boat generally designed for coastal defense duties and the patrol

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boat may be operated by the police force, coast guard, nation's navy. In addition, the various types of patrol boat such as large patrol boats, medium patrol boats, and small patrol boats intended for river or marine environments. The patrol boats engaged in several border protection roles such as fisheries patrols, anti-smuggling, immigration law enforcement, and anti-piracy.

The current shipbuilding market ask for a fast patrol able to enhance maritime security in the African continent and to combat piracy, illegal fishing, human and drugs trafficking.

Around the world, patrol boats are critical assets for providing coastal security and surveillance. The coastal patrol boats are designed to enhance maritime surveillance capabilities of the naval forces In addition to supporting private security efforts, many different types of patrol boats are used within the government and military programs of nearly every nation.

The increasing popularity of large patrol boats and small patrol boats across the globe due to a wide variety of duties performed by these boats in coastal waters, high seas, and rivers across the globe resulting in rising demand for patrol boats in various regions of the globe. In addition, growing demand for advanced patrol boats especially in emerging economies and increasing penetration of technologically advanced patrol boats across the globe. These are some important reasons for the high growth of the patrol boat market across the globe.

The challenges for the design of reliable patrol boats consist in developing an optimized hull form and integrating state of the art vessel components such as propulsion, power units, and mission equipment in order to offer a highly efficient and flexible platform, improving operability at sea. Patrol vessel designs are answering the operational requirements of surveillance and protection missions.

Patrol Boat Operational Requirements

Large endurance with fuel efficiency, good seakeeping performances by high speed and high sea states, flexibility of the lay-out allowing integrating fast ribs and, autonomous marine vehicles efficient integration of weapon, communication and surveillance systems are the key features of various designs. International shipbuilders can provide many different solutions with tailor-made characteristics for you to protect strategic places. Considering that clinet's main asset is the crew, ahouls designers pay special attention to the crew comfort and safety by delivering ergonomic lay-out design and high-quality accommodation and mission facilities.

- The patrol boat can be operated and controlled from a flying bridge with large windows, offering a wide-angle view of the horizon on all sides.
- A small caliber canon can be fitted on the fore deck can be fired against speed boats, helicopters and small aircrafts. The patrol boat should be armed with 12.7mm machine guns for defence against lightly armoured targets.
- The onboard HF and VHF radio equipment provides communication over short and long distances, while a stabilized video camera with a laser spotlight is used to detect and identify possible or confirmed targets.
- The boat should be equipped with high-definition marine radar, antenna mast, and searchlights atop of the surveillance bridge. Patrol boat can sail at high speeds and operate over a distance of 1,500nm, when sailing at a speed of 15kt. The hull should be designed to offer high sea-keeping performance.

EMPOWERING YOUR NAVAL PERFORMANCE

FORESEEING YOUR NAVAL NEEDS

ISRAEL SHIPYARDS Ltd

- **© Israel Shipyards**

- The boat should have the ability to endure for seven days without refueling. It should incorporate two electric generators systems and can be offered with two fixed-pitch propellers or waterjets.

International Shipbuilders R&D teams are continuously improving its patrol vessels – making them faster, quieter, more economical and more environmentally friendly. Designed for ultra-high-speed patrol duties in all waters interceptors patrol boats can outpace most other vessels. From maximizing operations and lowering risk to reducing operational costs. It's clear and obvious that patrol vessel operations can benefit greatly from autonomous vessel technology as well.

NVL (former Lurssen Defence) Fast Patrol Boats are optimised for ensuring the safety of littoral seas, waterways and coastal infrastructure. Combining high speed with exceptional seakeeping abilities, our patrol boats can deploy rapidly to the point of danger and swiftly neutralise any threat. They are built to complete demanding missions with absolute reliability. The integration of lightweight steel and aluminium construction with carefully designed hull forms facilitates fast and stable performance across a range of sea states. Precise levels of performance are customised to your particular needs, with speeds from 28 to as much as 45 knots being achievable. Operations can be sustained for between three and 14 days whilst range can extend up to an impressive 5,000 nautical miles. With patrol boat designs displacing from 50 to 700 tonnes and measuring up to 65 metres in length, NVL Group can readily supply vessels adapted to meet your exact requirements. Whether your mission is the rapid interception of smugglers and pirates or less overt intelligence gathering, we have a patrol boat that will satisfy your needs. Our naval variants are particularly well-suited for conducting surface warfare operations but are also equipped for defence against aerial threats. They also have the optional ability of being configured for anti-submarine warfare. All our fast patrol boats are sufficiently flexible to conduct a broad spectrum of naval and coast guard duties in territorial waters throughout the world, including operations in confined and shallow waters.

One of the **Israel Shipyards** vessels currently in highest demand, the SHALDAG FPC was designed in the late 1990s, integrating valuable improvements created by Israeli defense experts in response to real-life security challenges. The SHALDAG is most valued for security tasks where high intercept speeds and easy maneuverability are required. In addition, the vessel is equipped with highly advanced weapons systems, produced by world-recognized Israeli designers.
The combat-proven success of this unique ISL craft was quickly established with the Israeli Navy, attracting the attention of many other Naval forces.
Drawing on extensive operational experience in different environments, the craft continued to be improved, including the addition of newer lightweight weapons systems. To date, three types of SHALDAG have been introduced, in addition to several upgrades, Shaldag MK II, Shaldag MK III and Shaldag MK.

Paramount Group serves as a proud partner to numerous African navies, offering a wide range of advanced, multi-role naval vessels; from interceptor, light strike vessels to off-shore patrol vessels. In addition, the company has provided a myriad of systems installation and integration programmes, offering lifetime support in a local capacity, often accomplished through equipment upgrades installation and high-skills training. The company today leverages its 27 years of experience and expertise to develop and upgrade shore facilities in order for each of Paramount Group's partners to operate more efficiently, economically and sustainably.

Damen Shipyards Cape Town (DSCT) has constructed and delivered many vessels to the African continent over the years. Countries that the yard has delivered to include South Africa, Zanzibar, Angola, Kenya, Nigeria and Tanzania. Vessel type constructed and delivered have included inshore and offshore patrol vessels, dredgers, tugs, naval craft, research vessels, pontoons, and supply vessels. DSCT is a recognised supplier to South African Government bodies such as Transnet National Ports Authority (TNPA), Department of Agriculture, Forestry & Fisheries (DAFF), The Robben Island Museum

HAVELSAN offers increased safety and reduced waiting time for the vessels and improves operational effectiveness of all marine logistic operations. The system works in harmony with its users to monitor and organize all vessel traffic in most efficient way. It provides the most effective features to manage marine traffic even in the most congested areas (ports, strait) around the world.

The system also provides Coastal Surveillance to increase situational awareness for coastal and territorial waters. Thanks to it's Coastal Surveillance capabilities, it increases the effectiveness of search and rescue, outpost and reconnoitering activities. HAVELSAN is ready to serve improving the safety of your coast and territorial waters.

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(RIM) and the South African Navy (SAN). The company also builds and supplies vessels to private companies such as Smit Amandla Marine and De Beers Marine.

Recent Patrol Boat Deliveries in African Navies

- AIS data showed a second batch of three vessels arrived at the port of Alexandria aboard the heavy-lift ship Rolldock Sun on 14 February, Jane's reports. The vessel left Germany on 28 January carrying a 60-metre patrol boat bearing the pennant 710 and two 40 metre OPB 41 (previously marketed as the CSB 40) coastal patrol craft bearing the pennant numbers 705 and 706. In November 2020 it emerged that Egypt would be receiving nine Lurssen patrol boats and a single coastal defence boat from Germany under a 130 million euro deal after the contract with the original customer, Saudi Arabia, fell through.
- On February 12th, the first of the three new Multi Mission Inshore Patrol Vessels (MMIPV) of the South African Navy (SAN) was christened. According to information from the shipyard, Damen Shipyards Cape Town (DSCT), the 62 x 11-meter ship is the first Sea Ax ship to operate in South Africa. Sea Ax is a design patented by Damen, which is characterized by a straight, ax-shaped bow.
- In July 2020, Israel Shipyards announces an agreement with an African navy for the supply of two OPV 45 offshore patrol vessels. The vessels were designed for a wide range of missions, including protection against the increasing threat of piracy in the region.
- The OPV 45 is designed for a wide range of naval, paramilitary and HLS missions. It enables open sea patrol and surveillance and supports a wide variety of offshore missions such as the protection of facilities and EEZs, anti-terror/smuggling/illegal activity interdiction, intervention force boarding/landing, close-range naval combat operations, and enhanced search and rescue missions. The OPV 45 can also be equipped for minimizing illegal immigration transits, fishing protection and control, and anti-pollution activities.
- In early November 2020 Israel Shipyards announced the delivery of the last two of four Shaldag fast patrol boats to fulfil an order from the Senegalese Navy.
- Four Defender patrol boats arrived in port at Djibouti City, Djibouti, in two shipments in late February as part of a train-and-equip partnership between the U.S. Department of State and the Djiboutian military. The 27-foot boats were delivered to the Armed Forces of Djibouti (FAD) on 22 February 2020 for use by the Djiboutian Navy. Defender patrol boats combine an unmatched ability to conduct high-speed maneuvers in a compact deployable package.
- South Africa's Paramount Maritime Holdings, through subsidiary Nautic Africa, has delivered a new aluminium patrol and escort vessel to an unnamed Gulf of Guinea maritime security customer.
- The newbuild has a length of 35 metres, a beam of 7.5 metres, a ballistic-protected wheelhouse and deckhouse, facilities for launching and recovering one 8.5-metre boat, X- and S-band radar, and space for six crew and up to 50 passengers. Three Caterpillar C32 1,093kW engines driving fixed-pitch propellers give the vessel a maximum speed of 28 knots and a range of 1,150 nautical miles at 20 knots.
- Rohde & Schwarz has been chosen by the Senegalese Navy to install combat communication systems on the three OPV 58S patrol vessels Dakar ordered at the end of 2019 from the French shipyard Piriou-Kership.
- On 13 July 2018 the United Nations Office on Drugs and Crime (UNODC) Ghana Programme Office, in partnership with the Japanese Government, donated two alligator patrol boats to the Ghana Marine Police to enhance their operations in combating maritime crime.

Dimitrios Angelopoulos M.Sc.
Captain (Rtd)HN
Advisor on Defence and Maritime Security issues

After the hiatus caused by the Covid-19 pandemic when major events worldwide were cancelled, including our Africa Aerospace & Defence (AAD) scheduled for 2020, everything was in place for AAD2022. With the theme: “Exploring New Paths, Sharing Solutions, Showcasing Innovation and Capabilities,” this year’s event was hosted by the lead partner, the South African Aerospace, Maritime, and Defence Industry Association (AMD). Traditionally the administration of the show is rotated among the partners, AMD, Armscor, the Commercial Aviation Association of South Africa (CAASA), supported by the Department of Defence. “More than 70% of our exhibition space has been booked and nine countries have invested in national pavilions this year,” said Michelle Nxumalo, Exhibition Director. “These include Türkiye with two large pavilions, making it twice as large as the previous show, as well as the UK, USA, China, India, and several European nations. Importantly, an exciting showing of aircraft will be seen in the skies and on static display.” The US Air Force has committed aircraft such as the giant C-17 Globemaster III, a Lockheed Martin C-130J-30 Super Hercules, two aerial refueller aircraft, and a Sikorsky HH60 Pave Hawk helicopter.

For the first time ever AAD will have a flying display of unmanned aerial vehicles (UAVs), popularly known as drones.The organisers have invited a large contingent of official delegations to get a first-hand view on Sou.This year AAD had 200 exhibitors from 24 countries, with Turkey the biggest single country present with 25 companies, offering a range of technologies. What was significant was that 70% of the exhibitors were South African – apt testimony to the kind of innovation that has continued to take place despite the cuts in funding for the SA National Defence Force (SANDF).Defence industries worldwide are traditionally set up to service their own country’s sovereign defence needs. In SA, this is no longer the case because the defence budget has been slashed, leading to ongoing delays over the key Project Hoefyster, established to replace the SANDF’s ageing fleet of Ratel IFVs. In the absence of this project, many SA companies used the opportunity provided by AAD to step forward with their own innovative solutions to the Hoefyster crisis: from their own 8×8 and 6×6 wheeled IFV variants, to the much cheaper service life extension plan for the Ratel that could improve the serviceability of the almost 50-year-old design.

GHANA NAVY GRADUATES SPECIAL BOATS SQUADRON OPERATIVES

8 Operatives have been adorned Special Forces badges and graduated into Ghana Navy's Special Boat Squadron (SBS), after successfully completing training at the Naval Training Command (NAVTRAC). This was the maiden 6-months Boat Squadron Basic Operative Capability Course 1/22, at the Command.

The rigorous 6 months training regime produced 8 out of 25, to be the first batch of operatives to be trained on Ghanaian soil, who demonstrated a few drills at their graduation ceremony held on Thursday, 15 September 2022, at NAVTRAC, Nutekpor, in the Volta Region of Ghana, with the Chief of the Army Staff (COAS) Maj GenThomas Oppong-Peprah as the Guest-of-Honour.

The COAS, who represented the Chief of the Defence Staff (CDS) of the Ghana Armed Forces (GAF) – Vice Admiral Seth Amoama, emphasized the utmost need of the SBS that; in modern military setups, the establishment of Special Operations Forces has become a priority, as SFs remain one of the most flexible and useful instruments in a country's national security toolbox, that can be used to protect vital national interests.

Maj Gen Oppong-Peprah furthered that if one considers that, economic activities in Ghana's maritime domain keep increasing, with especially the Oil and Gas, fisheries sectors, being accompanied with dynamic and complex maritime security challenges, then GN's quest to possess an elite, well-trained, well-equipped force, capable of conducting all kinds of maritime interdictions in specialized operations, cannot be over emphasized.

In his remarks, R/Adm IA Yakubu Chief of Naval Staff commended the Ghana Army for the use of the Army Special Operations Training School (ASOTS), Daboya, and the Ghana Air Force for provision of air support, in the training of the SBS, and urged for continued collaboration between the three Services of GAF.

The conduct of the SBS training in Ghana is one of the key conditions required to achieve the objective

of capacity building in the Special Boat Squadron 5-year Development Plan, which is up to 2026, and was drawn by the Tripartite Partnership of the GN, the Danish Naval Special Warfare Group (Frogman Corps) and the USAFRICOM.

Dignitaries present to witness the ceremony included the Ambassador of Denmark to Ghana HE Tom Norring, General Officer Commanding, Northern Command – Brigadier General Matthew Essien, the Acting Chief of the Air Staff (CAS) and also Base Commander Air Force Base Accra – Air Commodore Joshua Mensah-Larkai, Flag Officer Commanding – Eastern Naval Command – Commodore Emmanuel Ayesu Kwafo, United States Defence Attaché at the Accra Embassy – Commander Calton Maclian, Member of Parliament for South Tongu – Wisdom Kobena Wayome, the Sergeant Major of the Army – Master Warrant Officer Ansah-Yeboah Isaac.

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IDE utilizes high-end technologies in the design and development of advanced products in the areas of Missile Electronics, Tactical IP Communications, Integrated C4I Systems, Surveillance, Hybrid Electric Power Systems, and Unmanned Systems. The Company retains its international recognition through the long standing participation in European and NATO new technology development programs. Utilizing advanced production capabilities and large-scale project management know-how, IDE is a key player in the high technology sector of the Hellenic Defense Industry.

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The Mission: Transfer Of Technology

For over 60 years Israel Shipyards Ltd. has served the naval and commercial marine industries. ISL is recognized internationally as a top-quality maritime operation that designs and builds naval vessels for the Israeli Navy and customers around the world. Israel Shipyards is a one-stop-shop company committed to delivering the latest solutions for a variety of missions. It is successful by having all the necessary disciplines under one roof which gives customers the most precise designs, production protocols and a construction process to meet their most stringent requirements.

One of the key values of ISL provides is the comprehensive Transfer Of Technology programs enabling our customers to use local labor, infrastructure, and resources to create independent maintenance and repair for the vessels in their own facilities. The TOT is conducted upon demand based on current capabilities and upgrading options. The programs are adjusted from minimal to full-scale TOT including training of engineers, specialized workforce teams, and provision of the required infrastructure for vessel construction and maintenance.

ISL Training Programs include team leaders from all departments and includes both theoretical and practical hands-on sessions. Recently Israel Shipyards Ltd. completed the first phase of TOT course for one of our customers at the facility in Haifa Bay.

The Construction and Maintenance TOT training program was assembled and approved by the customer to provide all the necessary knowledge and skills for conducting the maintenance and independent repairs at the customer's shipyard facility. The training program — custom-designed — provided 8 months of hands-on workmanship training to the customer.

During construction of the SHALDAG MK V, the Officer in Charge assigns each team member, according to his job description, to the relevant building dock or workshop where the assembly and sub-assembly operations take place in order for them to become proficient in all required tasks.

ISL ship construction is one unit of the total TOT training program was developedaccording to our modular process for shipbuilding.

The Ttransfer Of Technology training includes all stages of the vessel construction phase to equip the trainees with effective, efficient skills and self-reliance for Maintenance and Repair at their local shipyard.

Upon successful completion of the eight-month TOT Training Program the customer declared it a major milestone. ISL Executives hosted a ceremony at its facilities and the V. I. P. in attendance for the event was the top Admiral from the purchasing country to personally express his appreciation. Israel Shipyards will provide continued on-site support to the TOT program in later stages at the customer's shipyard.

Today, Israel Shipyards, Ltd. is an internationally recognized builder of top-quality naval vessels for customers around the world, continuously developing its portfolio to offer new designs in response to the challenges of the maritime environment. Its manufacturing and repair plant is spread over 330,000 sq. meters with 45,000 sq. meters of under-roof facilities and a 1000-meter wharf.

As a global Shipyard, with close ties to Israel's Navy and defense industries, we ensure customers of a significant edge. ISL management and employees, comprised with a professional team of former naval officers, utilize the Navy's shared combat experience and its access to the latest defense technologies in the customized planning of every new vessel and repair project. Customers also benefit from a determined dedication to uncompromising quality, lifetime support, and competitive pricing.

Eitan Zucker, Israel Shipyards CEO shared, "At Israel Shipyards we work tirelessly to enable our customers to receive a comprehensive and long-term solution for their various needs in securing their maritime borders —from the construction of vessels suitable for missions in the region, to knowledge transfer services that enable long-term savings for the customer."

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AFRICAN NAVIES

★Nigerian Navy Transformation

The evolution of the Nigerian Navy (NNn terms of platforms, manpower, organization and capabilities in its almost 60 years of existence gives a fair idea of the transformational milestones that has taken place in the Service. To this extent, transformation is not a new concept per se in the NN. However, promulgation of the Nigerian Navy Transformation Plan (NNTP) 2011-2020 in Dec 11 brought all aspects of NN strategic development aspirations into a single document, with all stakeholders aware of their roles.

The NNTP 2011-2020 was revised in Aug 14 and re-named 'Revised Nigerian Navy Transformation Plan(R-NNTP) 2011-2020', to achieve and sustain effective NN capacity to carry out her statutory roles. The R-NNTP 2011-2020 defines appropriate strategic objectives, milestones and requisite activities along identified Lines of Development (LODs), which are the pillars of the NNTP. These are Concept and Organization, Fleet Renewal, Infrastructure and Logistics. Others are Human Resources Management (HRM) and Administration, Training and Doctrine, ICT as well as Inter-Agency and Sub-Regional Cooperation. For easy categorization of completion time frame on each Developmental Objective (DO), the plan is driven on Short, Medium and Long Terms time-frames for completion of individual activities. Short Term activities are activities that could be completed within one year of initiation of such activity/project; Medium Term activities are those that could be initiated and completed within 3-5 years, while Long Term activities are activities that could be initiated and completed within 6-10 years.

To drive this process, the Nigerian Navy Transformation Office (NNTO) was established in Dec 10 and tasked to develop and coordinate all aspects of NN transformation activities. After 4 years of implementing the NNTP and cognizant of changes in the strategic environment, the NN considered it incumbent to strengthen the structures for the attainment of NN transformation objectives. Accordingly, the NNTO was upgraded to a branch and renamed Nigerian Navy Transformation Branch (NNTB) in Mar 15. At Naval Headquarters, the NNTB is structured into 4 directorates, namely; Directorate of Transformation, Directorate of Innovation and Concepts Development, Directorate of Monitoring, Evaluation and Analysis, and Directorate of Special Projects. The Chief of Navy Transformation (CN TRANS) is responsible to the CNS for all transformation activities in the NN. Command Transformation Officers drive the transformation process at the commands and enhance effective liaison with the NNTB.

The responsibilities of NNTB are as follows:

- Formulation of strategies for guiding the translation of the transformation pillars into concrete competencies in terms of organizational and personnel efficiency and credible force structure to drive the NN transformation process.
- Development of transformation strategy for the NN and its re-appraisal from time to time.
- Management of the NN transformation plans and processes at all levels of command.
- Conceptualization and development of the CNS Vision.
- Encouraging rapid innovation in response to emerging challenges.
- Conduct of demonstrations or pilot schemes on innovations.
- Advising and updating the CNS on the transformation of the NN.
- Provision of guidance in conjunction with NHQ, NASS, and NDAC on the development and investigation of future operational concepts, technologies and strategies.
- Collaboration with DHQ, the Services and other relevant agencies on transformation matters.

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Nigerian Navy commissions new patrol boats

In actualising the CNS Vision and Mission statements, key priority areas in the R-NNTP 2011-2020 were identified for implementation to positively impact NN operational efficiency and personnel morale. The priority areas and specific objectives were articulated in CNS Strategic Directive 2015-1 of 31 Aug 15. The NNTB was tasked to generate Key Performance Indicators (KPIs) and Assessment Mechanism to monitor implementation of CNS Strategic Directive 2015-1 by branches, commands, ships, units and establishments. Accordingly, the Branch has developed a template Score Card for measuring the performance of NHQ Branches, commands and autonomous units in executing the assigned tasks in line with the CNS Strategic

Transformation is not just a one-time reform, nor is it just only about restoring certain values, but a process that involves fundamental restructuring, radical and profound changes which will be a complete departure from 'business as usual'. Transformation is also about internal fundamental change and innovation and this is the context in which the NN transformation process should be understood. The foundation for attaining NN transformation objectives is effective communication of NN Core Values, CNS Vision, Mission and strategic goals. Consequently, the NNTB shall continue to conduct awareness and sensitization lectures, seminars and workshops across NN commands and establishments on a continuous basis to ensure that the personnel understand their roles in the process. This is borne out of the fact that transformation involves managing a change process and not a one-off event.

Furthermore, bearing in mind that transformation in itself is only a process towards enhancing the NN operational effectiveness, the NNTB will continue to flag issues such as business transformation priorities, outsourcing basic support services and logistics and encouraging innovation that would substantially lead to reduction in wastages from NN administrative and operational processes. NN transformation initiatives shall also continue to align with the national vision such that the NN will be among the top navies in the world.

Source:www.navy.mil.ng

GNS YAA ASANTEWAA

★Ghana Navy

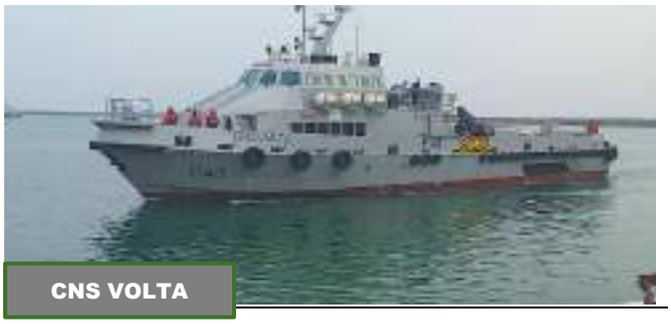
The mission of the GHana Navy is to develop and deploy maritime forces with the capability to ensure a safe, secure and clean maritime domain of Ghana in collaboration with other stakeholders in order to ensure a sustainable use of the maritime domain as well as to maintain a modern robust Naval force capable of defending Ghana against seaborne threats and ensuring the safety and security of the maritime domain for the development of the blue economy while maintaining the time-tested traditions of the Navy.

The Warrior Class: Ships were built by LURSSEN WERFT in Germany and commissioned into the German Navy as BUSSARD and ALBATROS respectively in 1978. The Ships were decommissioned in March 2005 and later refurbished and purchased by the Ghana Navy in July 2012. The Ships have a length of 57.58 m, a beam of 8m and a draught of 2.78m. The Ships are normally deployed for anti-drug trafficking, anti-smuggling, anti-piracy and fisheries enforcement ops.

Snake class:The ships were built and launched on April 2011 by Qingdao Qianjin Shipyard, China. They were commissioned into the Ghana Navy in Feb 2012. And have been primarily used for anti-drug trafficking, anti-smuggling, anti-piracy and fisheries enforcement ops. They have a length of 46.4, and a beam of 7.2

The Cutter Class: Ships were originally employed by the US Coast Guard and named as USCGS SWEET BRIER and USGGC WOODRUSH respectively. They were built by the Marine Builder shipyard in 1944 and decommissioned. They were acquired by the Ghana Navy in 2001 and employed as Logistics support Vessels and for humanitarian assistance and disaster relief operations. Additionally they serve as training ships for the fleet. They have a length of 55 m , a beam of 11m and a draught of 3.7m.

DEFENDER AND CNS CLASS:These are a collection of Port Security Boats & Chinese Defender Boats. These boats/ships are primarily deployed to in fighting illicit activities at Sea and on the shores such as piracy, illegal unregulated fishing , drug trafficking and oil bunkering within Ghana's territorial waters.



CNS VOLTA

RIVER CLASS: The River Class Ships are the newest addition to the Ghana Navy's Fleet, built by the Penguin Shipyard in Singapore and commissioned into the Ghana Navy on 25 Feb 2022. They are flex fighter boats with a length of 40m, a beam of 7.6 m and a draught of 1.89 m. They are primarily deployed to provide security for Ghana's offshore petroleum installations. ***Source:navyonline.mil.gh***

★South African Navy

South Africa has one of the longest coastlines in Africa, stretching for about 3 924 km at the high-water line, from the desert border with Namibia on the Atlantic coast, southwards around the tip of Africa and then north to the border with subtropical Mozambique on the Indian Ocean. South Africa has an extensive exclusive economic zone (EEZ) of 1 553 000 km², which also includes the areas around the Marion and Prince Edward Islands which comprise 474 400 km, one of the world's major shipping routes i.e. the Cape Sea Route, rounds the tip of South Africa, which forms a natural strategic choke point for a high concentration of shipping transiting the Atlantic, Southern and Indian Oceans.

South Africa is therefore a key point for shipping support and repair and will play a major role in the event that ships are rerouted around South Africa in the event of the closure of the Suez Canal. In addition, more than 30% of the world's crude oil passes the Cape Sea Route in any given year. In addition, African countries are increasingly becoming more important as oil suppliers. Most of those countries possess offshore oil fields. Southern Africa is strategically located between the Western and Eastern economic blocs.

The nature of South Africa's maritime security threats is by no means unique or limited to SA maritime borders, but forms part of the global current maritime security threats which include but are not limited to the following:

a. Drug Trafficking.
b. Illegal carrying and trafficking of Weapons and Ammunition.
c. Sailing in unauthorised areas.
d. Human Trafficking.
e. Illegal, unreported and unregulated fishing.
f. Illegal exploitation and unsustainable use of natural resources.
g. Illegal bunkering.
h. Marine and plastic pollution.
i. Money laundering.
j. Piracy and armed robbery at sea.
k. Maritime terrorism.
l. Natural disasters.

The South African Navy is one of the four Services that forms the South African National Defence Force (SANDF) commanded by Chief of the SANDF. The SANDF derives its mandate from the Constitution of the Republic of South Africa. The SA Navy is charged to provide the Chief of the South African National Defence Force with the requisite prepared and supported maritime defence capabilities necessary for the maritime defence and protection of the RSA and its people.
In this regard the following derived Military Strategic Objectives further directs the formulation of the SA Navy's Missions and Defence capabilities in order to meet these missions:

- Enhance and Maintain Comprehensive Defence Capabilities. (Defence and Deterrence).
- Promote Peace, Security and Stability in the Region and on the Continent. (Peace Support Operations).
- Support to the People of South Africa.

To this end the SA Navy must be able to carry out the following missions which include but are not limited to:

a. Operations against enemy forces.
b. Protection of maritime trade.
c. Combat search and rescue.
d. Combat and non-combat evacuation operations.
e. Peace support operations.
f. Anti-piracy operations.
g. Riverine and inland lake patrols.
h. Force Protection.
i. Disaster Relief & Humanitarian Aid.
j. Hydrographic surveying.
k. Support to government departments.
l. Border safeguarding.

The acquisition of three new Multi-Mission Inshore Patrol Vessels as part of the rejuvenation of the SA Navy's patrol capability will significantly supplement the SA Navy's existing surface warfare capability with a more robust patrol capability due to their flexibility. Utilization of cost-effective simulation technologies contribute significantly to enhancement of functional warfare training programs. The SA Navy is well versed in utilization of various simulation technologies and its applications.

★Kenya Navy

The Kenya Navy is the naval branch of the Kenya Defence Forces. It is headquartered in Mombasa.

Kenya Navy has two major bases for its fleet with it being headquartered in Mtongwe base in Mombasa and Manda Bay (part of Lamu Archipelago) being the second naval base. The navy also operates naval stations in Shimoni, Msambweni, Malindi and Kilifi. The Kenya Navy fleet is organized into two fighting squadrons and a logistical support squadron, namely the pioneer 66 Squadron, the 76 Squadron and the 86 Squadron all supported by a Special Operations Squadron, the Fleet Maintenance Unit and a newly formed elite Marine Ranger Regiment.

Kenya Navy - Fleet - Current Vessels

-Jasiri Class survey ship and offshore patrol vessel

- P3124 KNS *Jasiri*

Built as an oceanographic survey vessel but latter fitted with armament at the navy's Mkunguni dock yard. Commissioned into the navy on 29th August 2012. It currently is the largest vessel in the fleet.

-P400 Class offshore patrol vessel

- P3134 KNS *Harambee II*

Former French P400 class patrol vessel **La Rieuse**. Donated by France for anti-piracy patrols.

-Shupavu Class large patrol boats, Gondan shipyard Spain.

KNS Shujaa and KNS Nyayo during India's International Fleet Review.- PH1 (NAO) Chris Desmond, USN

- P6129 KNS *Shujaa*
- P6130 KNS *Shupavu*

Built to civilian standards in 1997 and entered service in 1997. Armed with a 76mm and a 30mm gun in Kenya.

-Nyayo Class missile boats

- P3126 KNS *Nyayo*
- P3127 KNS *Umoja*

Built by Vosper Thornycroft, these are similar to the Omani Province class, and were delivered in 1987. Armed with 4 Otomat SSM, 1 76 mm OTO DP, 1 dual 30 mm AA, 2 20 mm machine guns From March 2009 to July 2011 these ships underwent an extensive refit at Fincantieri's Muggiano shipyard in northern Italy, during which their surface-to-surface missile (SSM) systems were removed, effectively reducing the vessels to an OPV configuration.

-Madaraka Class small missile boats

- P3100 KNS *Mamba* - classed as **Mamba Class**
- (For three other boats see retired Madaraka Class boats below)

Delivered from 1974-1976 (Mamba was delivered in 1976) and built by Brooke Marine along with three others of the class. KNS *Mamba* has a non-functioning missile system and is currently used as an OPV. Remainder of the class decommissioned and placed in reserve status. Formerly armed with 4 Gabriel SSM, 1 dual 30 mm AA.

-Galana Class/River Class medium landing ship (LSM) /coastal logistics ships

- L39 KNS *Tana*
- L38 KNS *Galana*

Built by Construnaves-CEN, Gondan, Spain and delivered in December 1993 from Spain and entered service in 1994. Used for logistics. These ships are unarmed and used for amphibious warfare.

-Archangel class RHIB (jet boat)

- 1 - 12 metre IPV

Built by SAFE Boats International and donated by the USA in 2006 to reduce gun and drug running.

-USGS Defender Class RHIB with outboard motors

5-7 metre IPVs were built by SAFE Boats International and donated by the USA in 2006 to reduce gun and drug running.

P101 Class IPVs

- P943
- P944
- P945
- P946
- P947

These ex-Spanish Navy patrol boats were built by ARESA (Arenys del Mar, Barcelona) from 1978 to 1982 and procured by Kenya in 1995. Each is 12m long, with a top speed of 16kts, and armed with a 12.7mm machine gun.

-Personnel Tenders

Two built by Cowes in 1998. Each can carry 136 passengers.

-YTB Harbour Tug

- KNS Ngamia

Built by James Lamont, Port Glasgow in 1969 for Mombasa Port Authority and transferred to the navy in 1983.

Members of the Special Boat Unit in a simulated mass casualty drill - U.S. Navy photo by Chief Mass

The ceremonial keel laying of Nigerian Navy HE OPV 76 Offshore Patrol Vessels Has Been Completed at Dearsan Shipyard

Within the scope of the requirements of the Nigerian Naval Forces Command where the design, integration, and construction belongs to Dearsan Shipyard, the ceremony of laying the keels for the 2 (two) units of 76-meter High Endurance Offshore Patrol Vessels, was held at Dearsan Shipyard on 16th September 2022, Friday.

The Ceremony was held under the auspices of Nigerian Ministry of Defence H.E. Bashir Salihi Magashi, Commander of the Turkish Naval Forces Admiral Ercüment Tatlıoğlu, Turkish Deputy Defense Minister Muhsin Dere, Nigerian Navy Chief of Naval Staff Vice Admiral Awwal Zubairu Gambo, Chairman of Board of Dearsan Shipyard Mr. Aziz Yıldırım, Nigerian Ambassador to Türkiye Ismail Abba Yusuf as well as many members of the Navy, local and foreign guests, and many local, and foreign press members have attended.

After the speeches, Dearsan Chairman of the Board Mr. Aziz Yıldırım, Commander of the Turkish Naval Forces Admiral Ercüment Tatlıoğlu, Turkish Deputy Defense Minister Mr. Muhsin Dere, Nigerian Minister of Defence H.E. Bashir Salihi Magashi and Commander of the Nigerian Naval Forces Vice Admiral Awwal Zubairu Gambo has attended the keel-laying ceremony. After the group photo shoot of the protocol members and the presentation of gifts for this ceremony, the guests were hosted in the cocktail area at Dearsan Shipyard and examined the first blocks of 2 units of 76-meter Offshore Patrol Vessels.

Offshore Patrol Vessel OPV 76

GENERAL

Length (Loa) : 76.80 m
Beam: 11.00 m
Draft: 2.90 m
Displacement: 1100 t
Max Speed: 28 kts
Range: 3000 NM
Hull: Steel
Superstructure: Sealium
Crew: 43 People
Classification: Turkish Lloyd

PRIMARY MISSIONS

Anti-Air Warfare (AAW)
Maritime Interdiction Operation
Anti-Surface Warfare
Surface and Air Surveillance
Naval Gun Fire Support
Special Forces Operations
Search and Rescue Operations
Execution of Intelligence Operation
Protection of Economic Activities

SECONDARY MISSIONS

Asymmetric Warfare
Patrol Duties
Anti-piracy
Anti-smuggling
Anti-drug Trafficking
Fishery Protection and Patrol
Disaster Relief Operation
Special Operation Missions

WEAPONS

76 mm. Leonardo Super Rapid Gun
40 mm. Leonardo Light Naval Gun
2 x 12.7 mm. Stabilized Automatic Machine Gun
2 x 12.7 mm. Manuel Use Machine Gun
2 x 2 SAM SIMBAD RC (MBDA)

CMS SENSORS & NAVIGATION SYSTEMS

Combat Management System (CMS)
Navigation Data Distribution Unit (NDDU)
Air and Surface Surveillance 3D Radar
IFF System (Interrogator and Transponder)
Electronic Support Measure System
CHAFF/DECOY System
Tactical Data Link System (TADL)
Electro-Optical Reconnaissance and Surveillance System
Fire Control Radar
Navigation Radar & LPI Radar
Warship Electronic Chart Display system (WECDIS)
War Automatic Identification System (WAIS)
Speed Log, DGPS, Echo Sounder
Gyro (x2 Gyros with INS) & Magnetic Compass
Meteorological System

PROPULSION & ELECTRIC SYSTEM

Main Engines: 4 x MAN 18VP185 Diesel Engines
Propulsion: CPP
Generator Set: 3 x Diesel Generator

EXTERNAL COMMUNICATIONS

Communication Switching System
Message Handling System
Audio Units/Voice Terminals
HF Radio Systems
V/UHF Radio Systems
VLF/HF Radio Systems
GMDSS
Weather FAX
SATCOM

INTERNAL COMMUNICATIONS

Alarm / Announcement (Public Address) and Entertainment System
Automatic Telephone System
S/P (Sound Powered) Telephone System
Local Area Network (LAN)
Satellite TV System
CCTV System

Launch of the second of three patrol vessels ordered by Senegal

© PIRIOU

The launch of the 'NIANI', the second offshore patrol vessel destined for the Senegalese Navy, took place yesterday afternoon in Concarneau (29). This stage marks a significant step in the progress of the programme for the supply of three offshore patrol vessels. In parallel, the first unit is in the outfitting phase before the start of its sea trials, and outfitting is also ongoing on the third vessel in preparation for launch. This contract was signed in November 2019 by Senegal's Ministry of Armed Forces and PIRIOU group. Built with the support and expertise of its partner company KERSHIP, the programme of construction of these three patrol vessels is spread over a period of 44 months, until summer 2024. It also includes a support period lasting several years in Senegal. Vincent Faujour, Chairman of PIRIOU Group said: "It is an important event for this boat but also more broadly for the OPV58S programme! Thanks to the motivation of the PIRIOU and KERSHIP personnel and the continuous working partnership with the representatives of the Senegalese Naval Staff, we are progressing according to schedule."

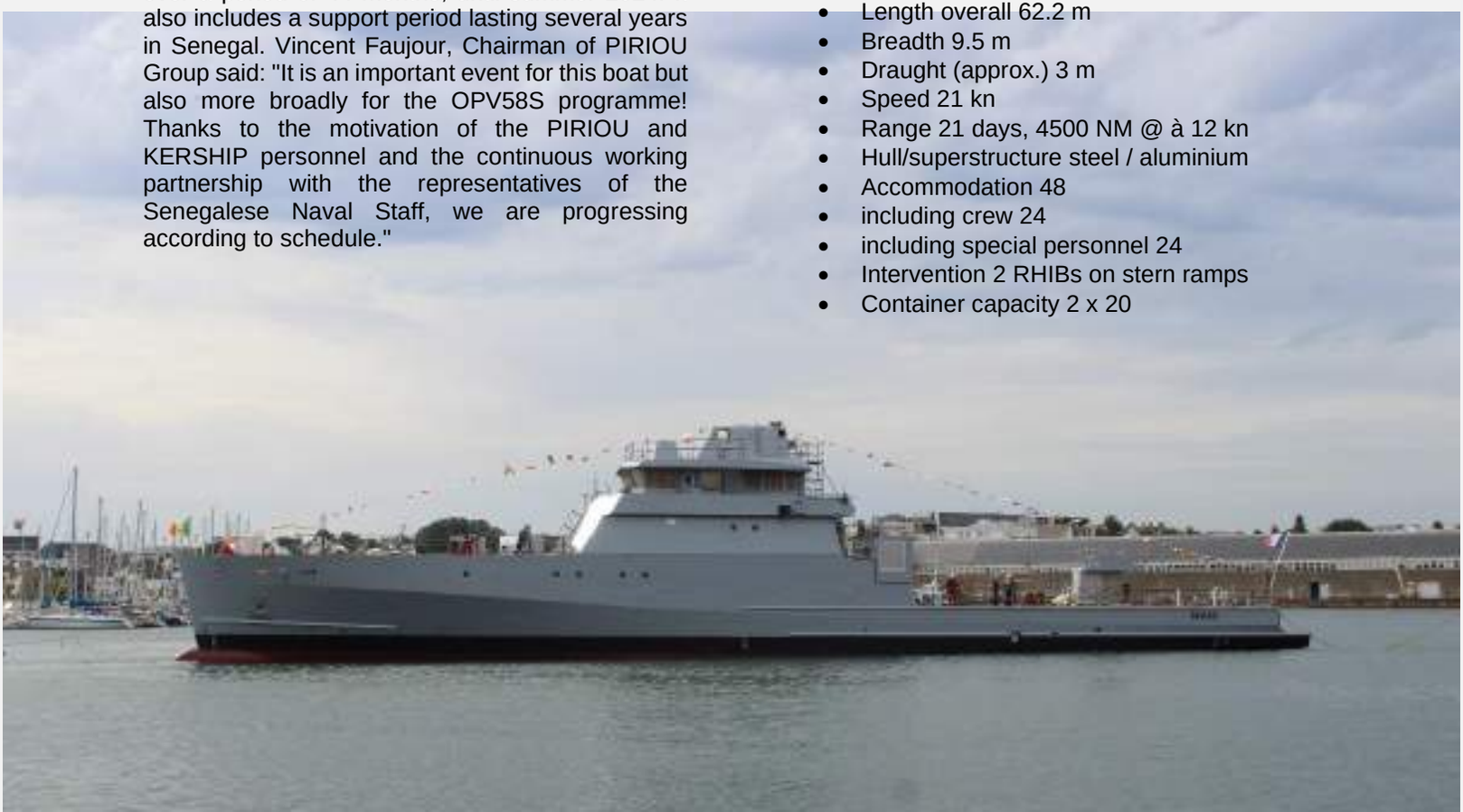
The OPV 58 S (Offshore Patrol Vessel) is a robust 62 m patrol vessel with outstanding versatility and high endurance. The OPV 58 S is dedicated to missions such as surveillance, identification and intervention, and fulfils the entire range of missions related to law enforcement. In addition to her deployment ability -intervention RHIBs- she possesses a first rank deterrence capacity thanks to her anti-surface and anti-aircraft weapon systems. Among innovations and major capacities, the vessel features:

- A versatile design to adapt to various missions
- A large panoramic bridge with 360° visibility
- A fast launching and recovery system for 2 RHIBs on the stern ramp
- A C-Sharp® hull for optimized autonomy and seakeeping
- A high-performance monitoring and combat system

These OPVs will be equipped with MARTE MK2/N anti-ship missiles. With the ability to strike at ranges in excess of 30 kilometres and their fire-and-forget capability, these missiles will provide the means to the Senegalese Navy to enforce their maritime superiority. The vessels will also benefit from the SIMBAD-RC system and its MISTRAL missiles- this combination providing an extremely effective defence capability against all threats including anti-ship missiles, combat aircraft, UAVs, helicopters, as well as small surface threats such as those presented by FIACs. These missiles and missile systems are designed and produced by MBDA.

Main characteristics:

- Length overall 62.2 m
- Breadth 9.5 m
- Draught (approx.) 3 m
- Speed 21 kn
- Range 21 days, 4500 NM @ à 12 kn
- Hull/superstructure steel / aluminium
- Accommodation 48
- including crew 24
- including special personnel 24
- Intervention 2 RHIBs on stern ramps
- Container capacity 2 x 20



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Armored Personal Carrier in the African Market

Armored Vehicles Manufacturers - related companies in Africa

South Africa is one of the top nations in terms of its production and supply of armoured vehicles to the rest of the world. South African armoured vehicles carry out one of two main roles: either a direct combat role that incorporates a variety of weaponry, or a personnel carrier function that protects troops and delivers them to and from the battlefield.
The most prevalent designs of South African armoured vehicles are,

- The Rooikat, created by South African defence major Denel, is an armoured reconnaissance vehicle with a primary attack function and fire support role.

- The Ratel – an alternative word for the honey badger – is known as the first wheeled infantry fighting vehicle to enter military service worldwide. It is currently in use with 13 militaries across Africa and the Middle East. The SANDF has more than 500 Ratels in its in arsenal while the Jordanian Armed Forces own around 300 Ratels.

- The RG-34 is a South African mine-resistant ambush protected (MRAP) light armoured vehicle, which is part of BAE Systems South Africa's RG series.

- The Casspir developed by South Africa's Council for Scientific and Industrial Research (CSIR) has been in service with the South African Army for more than 30 years, which has around 370 in service. It is also a popular model with the Indian Army and the US Army.

- South African defence firm Paramount Group launched the Mbombe mine-protected, high-mobility armoured fighting vehicle in 2010.Mbombe's hull can reportedly withstand a 10kg explosive even if it is placed underneath the hull or wheel arch. It also offers rocket-launched grenade protection and additional modules can withstand up to 50kg of explosives from a range of 5m away.To protect itself, the Mbombe can be fitted with machine guns or an autocannon and has both day and night vision equipment for improved situational awareness. The Mbombe is currently in services with the Jordanian and Kazakh Armed Forces. Paramount Group recently showcased the latest generation Mbombe 4 at IDEX 2019 in Abu Dhabi, the UAE.

- Denel Land Systems' Badger infantry combat vehicle is part of a new generation of South African armoured vehicles, which is designed to replace the ageing Ratel model within the SANDF. Completion of delivery of 264 Badgers to the SANDF should occur by 2022, according to the Project Hoefyster contract. The Badger is a South African-grown variant of Finland's Patria Armoured Modular Vehicle.

- Milkor 4×4 is a new armoured personnel carrier (APC) developed by Milkor, a South African defence vehicle manufacturing company. Designed to meet the infantry carrier requirements of armed forces in the African continent, the Milkor 4×4 APC is used for troop transportation, casualty evacuation, and riot control missions.

- The Mamba is a South African armoured personnel carrier designed for internal security purposes. It was developed during the late 1980s to replace the Buffel in service with the South African military and security forces. The first models were built on a 4X2 Toyota Dyna chassis, which was subsequently replaced in production around 1994 by a more reliable Unimog chassis. All marks of the Mamba were designed to be mine-resistant and blastproof.

In the foreseeable future one can also expect closer cooperation between the African companies, such as the development of the ST-100 and ST-500 armoured personnel carriers (APCs) for Egypt's

International Marathon United Technology Group (IMUT) by South African Saksa Technologies.

Proforce is a specialized manufacturer of armoured vehicles in Nigeria and supplies a wide spectrum of defence solutions since 2008.

Paramount and Namibia's Windhoeker Maschinenfabrik (WMF) are currently engaged in armoured vehicle trials in India. In addition,the United Arab Emirates Army will buy the new Mbombe 4 armored car from South African company Paramount, marking the vehicles first sale, according to Paramount's founder and chairman, Ivor Ichikowitz.

Recent Armored Vehicles sales in Africa

Nigeria
The Nigerian Army has ordered 28 Ezugwu armoured personnel carriers for counter-terrorism/insurgency missions, a month after the vehicle was unveiled by the Defence Industries Corporation of Nigeria (DICON). The Nigerian Army on 12 November announced that it had formalised an agreement with DICON and the Command Engineering Depot on the mass production of the Ezugwu.

Malawi
In January 2020, Malawi Defence Force (MDF) received a new fleet of armoured vehicles from the United Nation (UN) to help the Malawi soldiers in their peace keeping mission in the Democratic Republic of Congo.

Mali
In January 2020, the United Arab Emirates (UAE) is supplied Mali with 30 Typhoon armoured vehicles, for improving Mali's armed forces to fight growing insecurity in the region. The European Union has also delivered another batch of Bastion vehicle.

Niger
As part of its ongoing support of the Nigerien Armed Forces' anti-extremism efforts, U.S. Ambassador to Niger Eric P. Whitaker in September 2020, presented Niger's military with $8 million in equipment and spare parts, including 22 American-made Mamba armored vehicles. Minister of National Defense Issoufou Katambé received the equipment on behalf of the Nigerien Armed Forces (FAN).

Ghana
Turkish defence industries have slowly been increasing their presence in Africa. Recent recipients of transfers of Turkish equipment include Ghana, which has acquired Cobra and Cobra II armored vehicles, produced by the Turkish firm Cobra.

Somalia
In August 2020 Turkey donated 12 new armored personnel carriers to the Somali military to support its fight against al-Qaeda affiliated group al-Shabaab. Somali Defense Minister Hassan Ali Mohamed and Somali armed forces commander Gen. Odawa Yusuf Rageh received the donation at a ceremony held in the capi, al Mogadishu.

Tunisia
In January 2020, BMC, one of Turkey's leading defense contractors, is set to produce armored vehicles for Tunisia as part of a recent deal with the country's Interior Ministry.The contract was signed after the Turkish land vehicle manufacturer won the International Armored Vehicle Tender for the production of a total of nine 4x4 Medium Class Multi-Purpose Armored Vehicles (MPAVs).

Kenya
The KDF also received 12 Bastion Armoured Personnel Carriers (APCs) from the United States as a donation to help secure its borders and promote peacekeeping in Somalia, where its troops have been serving under the African peacekeeping mission, Amisom. For the APCs, Kenya bought 12 MD5 diesel engines from France, Sipri says.

Uganda
The Uganda People's Defence Forces (UPDF) will t receive 45 South African-manufactured Mamba APCs for assembly at the Armoured Vehicle Manufacturing and Assembly Facility in Jinja, which President Yoweri Museveni opened last August.

In the last two decades, Russia has managed to deepen its connection with Africa and became the biggest arms supplier on the continent. Russian armored vehicles for moving and delivering special-purpose units and their equipment are most in demand in African countries. In particular, the BTR-80A, BTR-82A armored personnel carriers, infantry fighting vehicles as well as the Tigr family of armored wheeled vehicles.

HENSOLDT South Africa introduces new naval surveillance radar

Quadome is a three-dimensional multi-mission naval radar that punches well above its weight class for air and surface surveillance, as well as target-acquisition.

HENSOLDT South Africa is introducing its newly developed Quadome radar system for naval surveillance and target acquisition. Equipped with the latest technology, Quadome provides rapid response and high precision, at an excellent price-performance ratio.

The product was announced internationally at the Defence Services Exhibition International (DSEI) 2021 in London, UK, on 15 September 2021, building up to the launch in South Africa, where the product is being developed.

The new-generation technology modernises one of HENSOLDT's key radar product lines and further enhances the group's extensive radar portfolio. "Quadome is a result of many man-years of engineering effort to develop a world-class product that will revolutionise the radar landscape worldwide," says Rynier van der Watt, Managing Director of HENSOLDT South Africa.

The Quadome advantage

This innovative dual-mode, multi-mission surveillance radar will provide naval forces and maritime security authorities with unprecedented situational awareness and extremely short reaction times. Fast detection and tracking of small, slow and fast targets offers a reliable and stable air picture, with fast track-initiation to support longer effector keep-out range.

Quadome features two main operational modes that simplify operator interaction and reduce operator workload. Surveillance mode is used for general surface, and air surveillance, while the self-defence mode is employed for high-threat situations and target engagement, with helicopter support continuously available in either mode.

The new-generation radar features the latest active electronically steered antenna (AESA) technology and is software-defined, thus being a future proof solution with an extended operational lifetime.

“Quadome is designed to maximise system performance, while minimising acquisition and life-cycle costs,” says Bennie Langenhoven, Chief Executive of the Radar Business Unit.

South African innovation

The development of Quadome is undertaken in South Africa through a close collaboration between HENSOLDT South Africa and the Council for Scientific and Industrial Research (CSIR), with over 40 engineers collectively working on this product development since 2018. It is currently the largest defence radar development programme in South Africa and entrenches HENSOLDT South Africa as one of the major players in radar in the country.

HENSOLDT South Africa is leveraging its own specialised product development experience, radar portfolio management skills and insights into global market requirements, complementing the CSIR’s vast experience of more than 75 years in radar technology.

“This partnership with HENSOLDT South Africa supports the CSIR’s strategy of strengthening industrial development by working closely with private and public sectors to address the needs of industry and society,” says the CSIR’s Divisional Group Executive of Mining, Manufacturing, Defence and Security, Dr Motodi Maserumule.

Developed by HENSOLDT South Africa on behalf of the HENSOLDT Group, this product enhances the value proposition of HENSOLDT South Africa to the world market. “Not only is a Quadome a world-class product that will revolutionise the radar landscape worldwide, it also makes a significant contribution to the technology available to detect and protect our own borders and seas in the South African defence landscape,” says van der Watt.

Target market

Quadome is aimed at the global market for tactical naval radar systems, mainly targeting offshore patrol vessels (OPVs), corvettes, light frigates and support vessels.

Because of its compact size, relatively low mass and excellent price-performance ratio, the Quadome radar brings 3D air surveillance and air defence capabilities to vessels that that may otherwise only have been fitted with 2D target-detection capability.

Quadome operational benefits

Designed for the modern operational needs of the naval domain, Quadome offers robust capabilities for the detection and tracking of small surface targets and accurate 3D tracking of small, low-flying, fast-moving air targets, ensuring effective threat evaluation, weapon assignment and a longer effector “keep-out” range due to fast track-initiation. Quadome operates in C-Band for operationally advantageous reasons, offering the best compromise for small- and medium-sized vessels demanding high performance.

© HENSOLDT introduces Quadome radar system for naval surveillance and target acquisition.

Saab Receives Service and Maintenance Order for South African Gripens

© SAAB

Saab has received a support contract for the service, repairs and maintenance of the South African Air Force´s Gripen C/D jet fighters. The order value is MSEK 333 (MZAR 532) over a three-year period. The contract runs for three years from 2022 until 2025 and covers service, repairs and maintenance as well as minor updates of the support and training systems of the South African Air Forces Gripen system. South Africa is operating Gripen C/D since 2008 and is Saab´s first export customer on Gripen.

“I am very happy and satisfied that we have now reached an agreement for a new support contract, so that we in the very best way can support our customers with their operational needs,” says Åsa Schöllin, head of Saab´s business unit Gripen Sustainment.

Gripen C-series is the most reliable swing-role combat aircraft available in the world today. Over 150 million people in five countries on three continents rely on Gripen C-series to protect their sovereign air space and ensuring their independence. Gripen C/D has successfully participated in Nato-led as well as numerous exercises and air policing assignments across the world.

Malian Armed Forces fighter jet crashes in eastern Mali

On 4 October 2022, a fighter jet of the Malian Armed Forces crashed morning near the airport of the city of Gao, in the east of the country.

As confirmed by the General Staff of the Armed Forces in a communiqué, the aircraft, model Su-25, was returning from a mission to support the civilian population in the region of the same name.

Africa Air Force Forum 2022: We are going to Dakar!

LOM PRAHA TRADE became the strategic partner of Africa Air Force Forum 2022, which will take place on 26-27 October in Senegal’s capital Dakar. For our company, air forces of African countries have been among most important partners, including the countries in West Africa. The Forum is therefore great opportunity not only to strengthen these partnerships, but also to introduce our portfolio to new customers and network with representatives from across the world.

Africa Air Force Forum is a high-level international conference addressing current challenges in the aviation and defence sector through keynote speeches, technical presentations, panel discussions and more with focus mainly on African continent. At the same time, the event hosts international exhibition for businesses engaged in related air defence technologies as well as maintenance, repair and overhaul of the aircraft, which is also one of the key topics of the conference.

Our company is looking forward to present our capabilities in the field of MRO and life-cycle support together with our services in real and simulated training of aircraft crews. Come meet us in Dakar!

SONGAR Armed Drone Systems to Nigeria

ASISGUARD, which operates in the Turkish defense and cyber security sectors, has completed the delivery of the SONGAR Armed Drone Systems to Nigeria. The delivery of SONGAR systems to the Nigerian Police Force was completed on September 15, 2022, according to an announcement shared by the company on its twitter account. Other details, such as the contract’s value and the number of drones delivered, have not been disclosed by the company.

Safomar Aviation Pty (Ltd)

Safomar Aviation, being the founding company within the Safomar Holdings Group, is delighted and proud to bring to you today the exciting development in the following distributorship for Safran Engines, for Southern Africa up to and including Kenya.

According to Shai Shalem Group Chief Executive Officer Safomar Aviation has been appointed to manage the overhaul and repair programs including the stocking of engine related parts to support the distributorship. Our next addition is a distributorship with Safe Flight Powerline Detection Systems. An absolute must have for EVERY Aircraft and saves lives. And finally, we are delighted to announce the reopening of the Enstrom Helicopter Corporation. American made and now American owned again! In the coming months, Enstrom will be ramping up all capabilities to ensure that the Enstrom fleet of helicopters, both in Africa and the world are supported in real-time. Enstrom is actively engaged in the current production of 25 platforms in the coming year, enhancement upgrades, from glass cockpits across all models, a governor upgrade for the piston fleet and much more to be announced in the coming months. Enstrom, is built from the skids up, for safety and reliability, with a proven track record on the African continent and beyond. Safomar Aviation is the exclusive sales agent for these helicopters.

VISIT TO LEONARDO MILAN ITALY BY THE CHIEF OF THE NAVAL STAFF ON TUESDAY 4 OCTOBER 2022

US Senator Rubio Calls for Sanctions on Algerian Purchase of Russian Weapons

The People's Democratic Republic of Algeria is one of the top global purchasers of military equipment from the Russian Federation. The Countering America's Adversaries Through Sanctions Act (P.L.115-44) authorizes sanctions designations against any party that "the President determines knowingly . . . engages in a significant transaction with a person that is part of, or operates for or on behalf of, the defense or intelligence sectors of the Government of the Russian Federation."

On 15 September 2022, U.S. Senate Select Committee on Intelligence Vice Chairman Marco Rubio (R-FL) sent a letter to U.S. Secretary of State Antony Blinken calling for appropriate designation of parties whose significant purchase of Russian materiel enable Russia's destabilizing actions.

- "Russia is Algeria's largest military supplier. Algeria is also among the top four purchasers of Russian arms worldwide, culminating with a $7 billion arms deal in 2021. Influx of money from any source to Russia will only further enable Russia's war machine in Ukraine. Yet, sanctions available to you have not yet been utilized."

- "I encourage you to take the threat Russia continues to pose to global stability seriously and to appropriately designate parties whose significant purchase of Russian materiel enable Russia's destabilizing actions."

Kentucky Guard signal leaders swap knowledge, build relationships with counterparts in partner nation Djibouti

© www.army.mil

Kentucky National Guard Sgt. Corey Davis, with Joint Force Headquarters, wireless communications, conducts a check on knowledge, Aug. 17, regarding initial radio setup and functions testing with Djiboutian Armed Forces Bataillon d'Intervention Rapide (BIR). (U.S. Army National Guard photo by Capt. Cassandra Mullins) (Capt. Cassandra Mullins)

ISRAEL SHIPYARDS LTD UNVEILS NEW MARITIME SOLUTION AT THE 'EURONAVAL 2022', PARIS

Israel Shipyards will unveil another advanced multi-mission vessel at the Euronaval 2022.

The new vessel joins the company's unique tailor-made solutions all designed and construct in a strict quality assurance and long-term service at Israel Shipyards facility.

Israel Shipyards provides advanced maritime solutions with One-Stop-Shop capabilities by providing customized vessels to meet the customers' requirements to all needs in the Naval arena with the most complete and cost-effective defense and security solutions.

The company will also present three main vessel families, all operationally proven, mission-ready and are in service in Naval and law enforcements forces around the world:

- The renown **SHALDAG Fast Patrol Craft family** e.g., SHALDAG MK V proven solution for interdiction of seaborne terrorism, illegal activities, coastal law enforcements and EEZ protection
- The **Offshore Patrol Vessel (OPV) family** e.g., OPV-45 cost-effective designed for open Sea patrolling and surveillance operations and strategic assets protection
- The **Corvette family** e.g., S-72 - based on SA'AR class vessels with a cutting-edge capabilities that will be required in future combat scenarios.

In addition to shipbuilding the company provides full design and maintenance services for all types of Naval vessels and offers Transfer of Technology Services (T.O.T.) from shipbuilding, ship maintenance to the construction of customers shipyard facilities. All based on unique and individually designed packages. These services provided by Israel Shipyards' highly-skills experts, which enables our customers to gain a high level of professionalism.

VP Marketing of Israel shipyards, Mr. Oded Breier, said, "Israel Shipyards top priority is our customers satisfaction; therefore, we strive to provide a complete, integrated system, quickly and flexibly. We supply the vessels as well as all the systems required for installation and integration on the vessel according to the demand. Our production lines formulated based on a modular process for shipbuilding. This service allows the customer to select the most convenient and economical option for the long and short term."

Come meet our experts at EURONAVAL 2022, Hall 2B Booth E65

OPV S-45

OPV S-62 & SHALDAG MK V

OPV S-62

SHALDAG MK V

Paramount Aerospace Industries announces orders and customer deliveries of its Multi-Mission Mwari Aircraft

In a major boost to Africa's indigenous aerospace industry, Paramount Aerospace Industries, the subsidiary of the global aerospace and technology company, Paramount Group, today announced that it has secured customers and orders from multiple Air Forces for its revolutionary 'Mwari', the advanced reconnaissance, surveillance, and precision strike aircraft.

The orders for nine new Mwari's represent an important milestone in its commercial success and have resulted in full levels of production at Paramount Group's state-of-the-art aircraft factory, in meeting increasing global demand for the aircraft's unique capabilities. Mwari addresses a key global security requirement from air forces around the world, of any size, for advanced ISR and precision strike capabilities, in doing so, performing missions that previously required several different aircraft. It integrates design concepts from helicopters, surveillance platforms and reconnaissance aircraft with the ability to carry multiple systems, such as surveillance radar and electro optic sensor systems.

Unique to the Mwari is its Interchangeable Mission Systems Bay (IMSB), located in the belly of the aircraft, providing near-endless sensor and payload options which can be integrated and be swapped out in less than two hours to take advantage of its innovative 'plug-and-play' mission system. The modular pod allows this single platform to perform a multitude of roles without any aerodynamic or ordinance penalties. Mwari offers advanced onboard sensors, weapons and real-time data analysis that can undertake a wide range of missions, in austere and remote environments with very little logistical support. The aircraft is further purpose-built to be infinitely reconfigurable, allowing the application of Mwari in multiple roles and missions in response to diverse customer requirements around the world.

The digitally designed aircraft is manufactured in South Africa at a state-of-the-art factory on the Paramount Aerospace Industries Campus in Wonderboom, North of Pretoria. This facility is a vertically integrated operation that uses latest-generation machines to fabricate all airframe components and sub-systems directly from a digital model. This comprehensive, open-architecture and flexible system allows for the quick and low-cost integration of new pods, avionics, cargo, special mission equipment, weapons, and sensors, throughout the entire lifecycle of the aircraft.

© Paramount Aerospace Industries

IMPRESIVE PRESENCE FOR MILKOR AT AAD 2022, AS IT EXPANDS DOMESTIC SECURITY OFFERINGS

With Milkor's plans to become an established global leader in the defence industry, and with a growing international presence, the South African company exhibited a broad range of products at the Africa Aerospace and Defence exhibition 2022. Diamond Sponsor of the 2022 edition of the Africa Aerospace and Defence exhibition. Known for its proven multi-barrel grenade launchers such as the SuperSix range, Milkor AGL (Automatic Grenade Launcher), UBGL (Under-Barrel Grenade Launcher) and new MAR (Multiple Anti-Riot) grenade launchers. These were all featured at the AAD 2022.

In addition, At AAD 2022, Milkor showcased its newly designed unmanned aerial vehicles (UAVs) and armoured personnel carriers (APCs) including Milkor 380 medium-altitude, long-endurance (MALE) UAV, which according to South African-based defenceWeb, can be armed with a vast variety of armaments such as the new X-series precision-guided munition kit from the UAE's AL TARIQ, HALCON Desert Sting DS-16 lightweight, air-launched precision-guided munitions, and Thales Belgium FZ602 rocket launchers (the FZ602 is a two-tube reusable lightweight launcher).

Milkor 380 medium-altitude, long-endurance UAV has a 18.6 metre wingspan, and is fitted with an L3Harris Wescam MX-15 multispectral electro-optic/infrared (EO/IR) turret, and could also be fitted with Thales' synthetic aperture radar (SAR) for maritime patrol applications, but gimbals of various sizes and weights can be fitted.

The Milkor 380 at AAD 2022 is also being showcased with an Airborne Technologies SCAR (Self-Contained Aerial Reconnaissance) pod which Milkor says is ideal for things like maritime surveillance, especially when used on conjunction with the gimbal. The SCAR pod can be fitted with many different sensors, but at AAD is displayed with a ViDAR (Visual Detection and Ranging) optical radar system.

Milkor's UAV can be fitted with guided weapons and various payloads to perform multiple operations, such as SAR/ISAR (Synthetic Aperture Radar/Inverted Synthetic Aperture Radar), Communications Intelligence (COMINT), AIS (Automatic Identification System), communications relay, and communications jammer. The airframe includes five hardpoints: two on each wing and one at the centre of the fuselage, with the ability to carry larger systems if needed. The first prototype is undergoing ground testing and integration with various ammunition using five hardpoints, and the second prototype is currently being manufactured", says Ghaazim Rylands, CEO of Milkor Integrated Systems, a division of Milkor for manufacture and integration of the Milkor 380 UCAV.
Also exhibited is an improved variant of the Milkor 4×4 Armoured Personnel Carrier (APC) which was first unveiled at the AAD 2018. The vehicle's operational capability has been expanded to deployment in the desert with the option of an inline central tyre inflation system and an upgraded cooling package. Multiple electronic sensors and remote-control weapons stations (RCWS), such as a 12.7 mm machinegun option, have been integrated to increase the mission capability, situational awareness, and personnel safety of the vehicle. Milkor also offers an anti-riot version of its APC – the latter was deployed during the July 2021 unrest in South Africa.

The Milkor 4×4 armoured personnel carrier (APC) has undergone extensive development with Milkor adding various customised options suited for use by Police forces, Gendarmeries and Security groups. The Milkor 4×4 can be equipped with a front mounted scraper that clears away barriers, debris and immobilising objects. Optional roof mounted grenade launchers capable of firing less lethal grenades can deploy tear gas and other less lethal grenades in a 360-degree radius around the vehicle. The Milkor 4×4 offers various levels of armouring from B2, which can withstand a 9mm round, all the way to B7 which can stop armour-piercing and sniper rounds, ensuring occupant safety in various situations. The Milkor 4×4 anti-riot was deployed in the July Unrest experience in large parts of South Africa in 2021.

Milkor also highlighted its flagship naval vessel, the Milkor IPC (Inshore Patrol Craft) designed for any navy, coast guard or military. “The vessel is a one of a kind in the industry and is built for long endurance missions. Operations of up to five days can easily be accomplished through a unique design and layout that combines crew comfort with operational functionality that is suited for surveillance and potential engagement. Various features and configurations of the Milkor IPC will be on display at AAD 2022 highlighting Milkor’s marine design and manufacturing capabilities,” the company said.

The Milkor IPC (Inshore patrol craft) is a 12m hydrofoil assisted catamaran vessel capable of reaching speeds up to 50kts. With features like 3 sleeping beths and head and shower facilities it enables a crew of 4 to stay comfortable on long endurance missions with the IPC capable of staying active for up to 5 days. The vehicle is fitted with 2x 450hp engines ensuring maximum efficiency while patrolling while also enabling rapid response to emergency situations if needed. The IPC is the ideal vessel for patrolling rivers and coastlines for rapid detection and interception of maritime crimes like human trafficking, contraband smuggling, illegal fishing, illegal immigration and piracy. With a vast array of electronic hardware and software available the IPC can also effectively be used in search and rescue operations.

According to Milkor, the company has expanded its platforms to offer valuable solutions to Police, Homeland security, Gendarmeries, Coast guards and Security groups in the areas of Less-lethal engagements, anti-riot capabilities and large crowd control situations. Multi-role capabilities are one of the main focus points Milkor uses when developing their platforms, with each platform being able to easily and effectively be customised depending on end user requirements received.

TAI CONTINUE ITS PROMOTIONAL ACTIVITIES IN AFRICA REGION

Turkish Aerospace (TAI) participated in the Africa Aerospace and Defense fair, which took place in South Africa on September 21-25, 2022. The company presented its platforms, which has developed with national sources, and will make contacts with the delegations from the regional geography in order to develop regional business models. TAI introduced its aerial platforms and space projects to the delegations that will visit its booth of which take place National Combat Aircraft (Turkish Fighter), AKSUNGUR, ATAK, HÜRJET, HÜRKUŞ-C, ANKA, Small GEO and GÖKTÜRK.

Making statements about the African Aerospace and Defense Fair, Turkish Aerospace President and CEO Prof. Dr. Temel Kotil said, “Under the umbrella of Presidency of The Republic of Turkiye Defense Industry Agency, at the fair where Turkey will be represented within the framework of national participation, we will bring together the advanced technologies of our country in the field of defense and aviation industry with delegations from the African region and from different countries of the world. We are glad to meet the delegations within the scope of the fair to describe our aerial and space platforms as well as next generation business models” said. Deputy General Manager Atilla Doğan announced that TAI will deliver two domestically developed Hürkuş training aircraft to Niger by the end of the year and three to Chad in the first quarter of 2023, according to a company official Thursday.

Turkish Aerospace is the centre of technology in design, development, manufacturing, integration of aerospace systems, modernization and after-sales support in Türkiye. Located in Ankara, Turkish Aerospace production plant covers an area of 4 million square meters with an industrial facility of 640,000 square meters under its roof with almost 12.000 workers. The company has a modern aircraft facility furnished with high technology machinery and equipment that provide extensive manufacturing capabilities ranging from parts manufacturing to aircraft assembly, flight tests and delivery.

HAVELSAN'S PARTICIPATION AT AAD 2022

© HAVELSAN

HAVELSAN participated in the Africa Aerospace and Defence Exhibition, which was held on 21-25 September 2022 in Pretoria, South Africa to showcase its Land, Naval, and Air solutions for the defence and security forces of the nations in the African continent. At the event, the Ministers of Defence, Chiefs of Forces, Chiefs of Staff, senior generals and commanders, showed a great interest in in HAVELSAN's products and solutions.

In the first three days of the event HAVELSAN's booth was honoured by 31 delegations from 17 different countries. HAVELSAN's top management and business development team met with several delagations from a wide range of countries such as Botswana, Namibia, Nigeria, Zambia, Malawi, Tanzania, South Africa, and many others.

HAVELSAN promoted its competencies to its esteemed visitors and had the chance to discuss the possible opportunities of collaboration. in the fields of C4ISR Technologies, Simulation, Autonomous & Platform Management Technologies, Information & Communication Technologies and Homeland Security & Cyber Security.

As Türkiye's one and only, sole source proven combat management system provider, HAVELSAN proudly presented its capabilities in Surface/Underwater Command, Control, Communication, and Computer Systems, Air Command Control and Information Systems and Land/Joint Command Control Systems during the event.

As one of the world's leading simulator companies in the defence and aerospace industry, HAVELSAN informed the delagations about its best of simulation and training products, solutions and services. Also, HAVELSAN exhibited its autonomous unmanned aerial, land and naval vehicles, the units of its Digital Troops concept to the distinguished visitors. In this regard, BARKAN (Autonomous Medium-Class Unmanned Ground Vehicle), BAHA (Sub-Cloud Autonomous UAV) and SANCAR SİDA (Armed Unmanned Autonomus Naval Vehicle) greatly impressed the AAD audience.

Encouraged by the interest and high-level visits from various African delegations during AAD, HAVELSAN will continue to seek every opportunity and focus on business development activities to establish collaborations to meet the security and safety needs of African countries in the coming period.

HAVELSAN understands the growing importance of geostrategic aspects and dynamics of African continent in respect of natural resources and protecting sovereignty, integrity, economy and wealth of the various African nations. HAVELSAN through its holistic defence technologies is ready to provide its state-of-the-art products and offer smart solutions for every kind of challange and threat faced by the African security and armed forces.

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ARMOURED LAND CRUISER WITH SIX WHEELS!
SVI'S NEWEST MAX 3 VARIANT

- **SVI reveals the new MAX 3 Six-Wheeler at AAD2022**
- **Display vehicle also boasts intelligent anti-drone solution**
- **SVI stand at AAD2022 open to the public this weekend**
- **Watch the new MAX 3 Six-Wheeler in action**
-

SVI Engineering, leading specialist manufacturer of armoured products, has used the Africa Aerospace and Defence Show (AAD2022) to reveal the latest addition to its growing range of versatile bulletresistant vehicles: the MAX 3 Six-Wheeler. Like the standard version of the MAX 3, this new variant is built on Toyota's trusty Land Cruiser 79 chassis and likewise retains the Japanese firm's proven 4.5-litre V8 turbodiesel powertrain. What sets the MAX 3 Six-Wheeler apart, of course, is the upgrade from the standard two axles to three.

The six-wheel concept unveiled at AAD2022 is based on the MAX 3 Double Cab body style, though this new axle configuration will also be available on the company's MAX 3 Single Cab and MAX 3 Troopy armoured personnel carrier.

The addition of a third axle means the MAX 3's Gross Vehicle Mass (GVM) can be safely increased to 5 500 kg. This opens the door to numerous military and security applications, including the fitment of various weapon systems, cargo-carrying options and even field ambulance concepts. In order to keep the cost and complexity of the system in check, the additional axle is non-driven. Even so, the already impressive go-anywhere ability of the standard vehicle is enhanced as the extra axle provides increased flotation over soft surfaces. The proven, highly capable powertrain remains untouched, simplifying servicing requirements and the process of sourcing of spare mechanical parts. However, the six-wheel modification does include a track-width correction to align the track of the rear wheels with that of the front (a Land Cruiser 79 anomaly) as well as an upgrade to disc brakes on the two rearmost axles (in addition to the standard items at the front) to improve the stopping performance at full GVM. ANTI-DRONE SOLUTION The six-wheeler version of the MAX 3 Double Cab displayed at AAD2022 is also fitted with an intelligent anti-drone solution. In modern warfare, drones are used not only for reconnaissance but also as weapons capable of destroying key infrastructure or attacking soldiers on the ground. The anti-drone system offered by SVI employs radar to locate, identify and track incoming hostile drones. The information is relayed to the battle management system (BMS) connected to the automated grenade launcher (AGL).

HAVELSAN Integrated Border Security System (IBSS)

HAVELSAN is one of the leading technology companies in Turkey, established in 1982 as a corporation affiliated with the Turkish Armed Forces Foundation. Thanks to its decades-long experience and highly qualified human resources, HAVELSAN provides high technology-based software-intensive solutions and products for the armed forces and public and private sectors at home and abroad.

As HAVELSAN, we understand the growing importance of geostrategic aspects and dynamics of the African continent in respect of natural resources and protecting the sovereignty, integrity, economy, and wealth of the various African nations. As a result, we are dedicated to providing state of the art technologies and proven and reliable end-to-end solutions for every kind of challenge, threat, and need of African nations.

HAVELSAN Integrated Border Security System (IBSS) is developed to protect wide critical and strategic areas against threats attempting to cross borders and attack critical facilities. IBSS can be scripted upon scenarios that include popular threats, possible threats, geography-specific threats, and so on. IBSS is based on a hybrid architecture that combines distributed data fusion and central command & control and generates Joint Border Pictures from continuously updated Recognized Land, Maritime Border Pictures, and Critical Facility Situation received from sublevel C4I systems.

IBSS ensures monitoring the current border situation on a tactical level with UAV/COMBAT UAV integration. In addition, the IBSS also ensures necessary information flow in an absolute and accurate manner and provides increased situational awareness for dismounted border units.

The IBSS will be complemented with several borderline surveillance sites across the border, land assets such as Radar, Electro-Optical Cameras, Remote Controlled Weapons, unattended sensors, and surface assets, including patrolling vehicles and personnel equipment.

Perimeter protection of the bases and facilities behind the borderline, from surveillance sites to bases and headquarters, is also ensured in the IBSS scope. Casual CCTV solution in these areas with Video Analytics for software-supported surveillance is further enhanced with SWIR cameras, Motion Detection Sensors, Fiber Optic Acoustic Sensors, UAVs for increased intrusion detection, and controlled entry/exit/access control systems with road blockers, barriers, strengthened gates, ballistic guard houses for extended physical security purposes. Besides Border Security, maritime security and defense technologies are essential to integrated border security. As Land Border Security, the coast guard is a crucial element of the Integrated Border Security and Management System concept.

HAVELSAN CSRS aims to provide situational awareness with radar coating for the countries' coastal and territorial waters to create the Recognized Maritime Picture by supporting data from electro-optic sensors, Public Institutions, and/or other organizations. CSRS also increases the effectiveness of search and rescue, outpost, and reconnoitering activities. With the completion of the project, all territorial waters and adjacent areas within our country's sovereignty will be fully and effectively monitored, and crimes such as smuggling, illegal immigration, fishing, and marine pollution will be combated more effectively. HAVELSAN is the main contractor of the project's first phase for developing a CSRS software integrated into itself and with external systems/institutions and for installing and integrating coastal surveillance stations and operations centers to ensure uninterrupted surveillance of the coastlines using radar and electro-optical sensors.

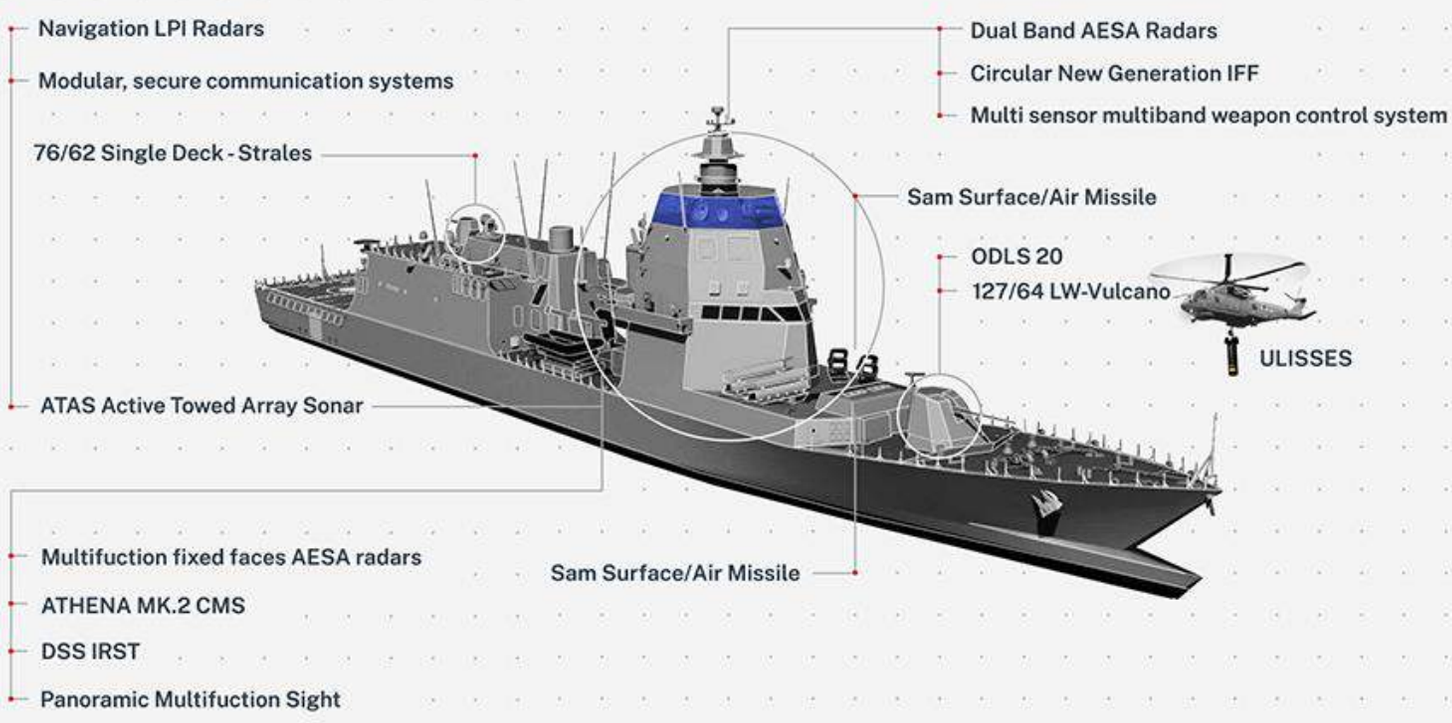
Leonardo: increasingly revolutionary naval electronics

For over 60 years Leonardo has been a strategic partner to the Italian Navy and a leading point of reference for the naval forces of many countries. The systems the company has developed make up more than 40% of a ship's components and are now onboard over 1,000 vessels worldwide.

Leonardo is currently one of the few companies worldwide to offer a complete range of technologies for naval use: from its Combat Management System (CMS) to kinetic (naval artillery, torpedoes) and missile systems (through MBDA, in which Leonardo has a 25% share) as well as sensors, communications and mission systems. Its complete range of proprietary technology products is the outcome of a stratification of skills over time and a unique partnership built over the years with its domestic customer, the Italian Navy. All enhanced by an intensive exchange of knowledge and experience with many of the world's navies.

Products testifying to Leonardo's high-level capabilities in this sector include the ATHENA CMS, internationally recognized as one of the best combat management systems and now in its MK.2 version. ATHENA is primarily known for its high calculation and data distribution speed. It is already capable of over 30,000 operations per second, five to six times more than competing systems, and has a near real-time tracking management. The arrival of new technologies such as supercomputing and artificial intelligence (AI) will lead to further growth and increased autonomy, but the system is already geared up to receive and optimize these revolutionary capabilities.

Leonardo's naval tecnologies



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The list goes on, with Leonardo's expertise also including naval optronic systems for fi re control and surveillance, an increasingly indispensable complementary technology to counter sea-skimming and short-range threats. In line with Leonardo's fl exile technology approach, these devices can also be fully integrated into ATHENA. The MEDUSA MK.4 , JANUS-N and SASS (Silent Acquisition & Surveillance System)systems are already installed on board many naval units, from the simplest types such as patrol boats to the most complex vessels like aircraft carriers and amphibious assault ships. The company is also developing new systems to provide ships with complete, all-round situational awareness.
ATHENA was conceived from the design phase to be upwardly scalable, allowing for expanded performance to adapt it to even more complex vessels or disruptive technologies. It will also be possible, for instance, to integrate ad hoc software for so-called 'multi-domain operations'. These aim to achieve a cumulative operational effect through the synchronized use of capabilities across the fi ve domains(land, sea, air, space, cyber). Everything can then be seamlessly represented on a dedicated tactical table to optimize and accelerate decision-making. This development was necessitated by the Italian Navy's desire to acquire the capability it offers, and also in light of the experience and data built up within the context of OCEAN2020, a European maritime surveillance research program led by Leonardo.

ATHENA's second big revolution is the graphic interface of the Command and Control (C2) system. This is optimized to be quickly usable and intuitive, requiring minimal training for effective use thanks to an extensive implementation of "wizard" procedures. Developed in cooperation with the Armed Forces, Leonardo's CMS enables reduced lead times for more complex operations, boosting a ship's reactivity in complex tactical situations. A CMS of this capability is naturally also designed to be integrated with the entire range of sensors in the company's portfolio, for example radar, another sector in which Leonardo is rapidly expanding with new-generation products. The spearhead of this is the KRONOS family , in which the KRONOSDUAL BAND (C- and X-band) and the POWER SHIELD (in "full digital" Le band) stand out. These were developed under the so-called Naval Law, the Italian navy's modernization program, for new naval units such as the PPA and the LHD TRIESTE.

These high-performance sensors are based on the successful KRONOS GRAND NAVAL with rotating antenna, already installed for some time on the BERGAMINI-class frigates, which has already demonstrated the ability to track even short-range ballistic missiles at distances of 300 km. The new sensors will have even more complex challenges in the future - long-range ballistic missiles, hypersonic missiles and saturation attacks – but will nonetheless be able to tackle these with optimal effi cogency thanks to their state-of-the-art technology and the ability of ATHENA CMS to manage them effectively. Leonardo's expertise in the sector also covers fire control radars, notably the NA-30S MK2, which have the ability to guide DART 76 and VULCANO guided munitions for 76 mm and 127 mm guns and more besides. In the underwater arena, in addition to the latest generation of light and heavy torpedoes - designed for the requirements of craft ranging from small anti-submarine units to new-generation submarines – sonar systems (ATAS , BLACK SNAKE , THESAN , ULISSES) and anti-torpedo countermeasures also deserve a mention. Leonardo plays a leading role in sonar technology, with innovative systems that combine high-level performance with physical compactness and are among the lightest in the sector. In particular, the ATAS is now the lightest variable-depth sonar for active and passive detection, which can be installed on ASW frigates and corvettes. Research in the underwater fi eld does not stop at hardware components but also covers all discovery algorithms, now developed in-house.

As regards countermeasures, over the years Leonardo has leveraged its100 years' experience in torpedo development to optimize the MJTE active systems, NATO -standard 'cartridges' that can be launched from any DLS (Decoy Launching System). These can reproduce a ship's sound profile and distract incoming threats with a market-leading level of effectiveness. Still on the subject of weapons systems, in addition to the already mentioned 76/62 and 127/64 – representing the state of the art in medium and large naval calibres - Leonardo has always pursued continuous innovation in small calibres, from the Lionfish 12.7 to the Marlin 30 and 40, available in different solutions. These come with their own FCS (Fire Control System), a crucial aspect for any naval units -generally those with low displacement – that lack this component.

Finally, Leonardo has also carved out a prominent position in the naval communications sector with its VHF and HF equipment, software-defi ned radios and Link-16 and Link-22 tactical links.

Israel Aerospace Industries Awarded Contract to Supply DroneGuard ComJam Systems for the Detection and Flight Disruption of UAS to a Country in Asia

Hundreds of DroneGuard systems are operational worldwide, and are used successfully to counter a range of UAS threats, including attempts to penetrate airspace or execute coordinated attacks

Israel Aerospace Industries (IAI) has been awarded a contract to supply DroneGuard ComJam systems for the long-range detection and disruption of Unmanned Aerial Systems (UAS) to an Asian country. The contract comprises several dozens of mobile systems. In recent years, the use of UAS has increased dramatically, and they have become a potential threat to borders, sensitive facilities, maneuvering forces and major events. UAS may be used for hostile purposes such as gathering intelligence, smuggling or even carrying armaments. Furthermore, their detection is often difficult because of their small physical size, slow air speed, and low altitude flight.

To deal with this threat, IAI's ELTA Division has developed DroneGuard ComJam: an advanced system for locating and disrupting UAS communications and navigation capabilities, whether they are operating independently or in groups (swarms), without impacting civilian communications and GPS in the same area.

The system detects hostile UAS, identifies their mode of operation, and disrupts their communications and navigation so that they are essentially shut down. DroneGuard ComJam offers the advantage of long-range operation, whereby the UAS is disabled while it is still far away – long before it poses a threat to the protected site. Hundreds of IAI's DroneGuard systems have been delivered to customers around the world, where they are used to protect critical installations, as well as major events such as the G20 Summit held in Argentina in 2018.

Adi Dulberg, VP & General Manager, IAI/ELTA Intelligence, Communications & EW Division: "IAI's Electronic Warfare systems are a force-multiplier when dealing with modern airborne threats. They are a key component in operational deployment by armies and security forces worldwide. Unauthorized border penetration by hostile UAS, or the ability to target maneuvering forces or crowded areas, could cause significant harm. Our customer's ability to defend against such threats will be significantly enhanced by the long-range detection and disruption capabilities that DroneGuard ComJam delivers." Israel Aerospace Industries Awarded Contract to Supply DroneGuard ComJam Systems for the Detection and Flight Disruption of UAS to a Country in Asia

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ISSN 1791-2962

African Security

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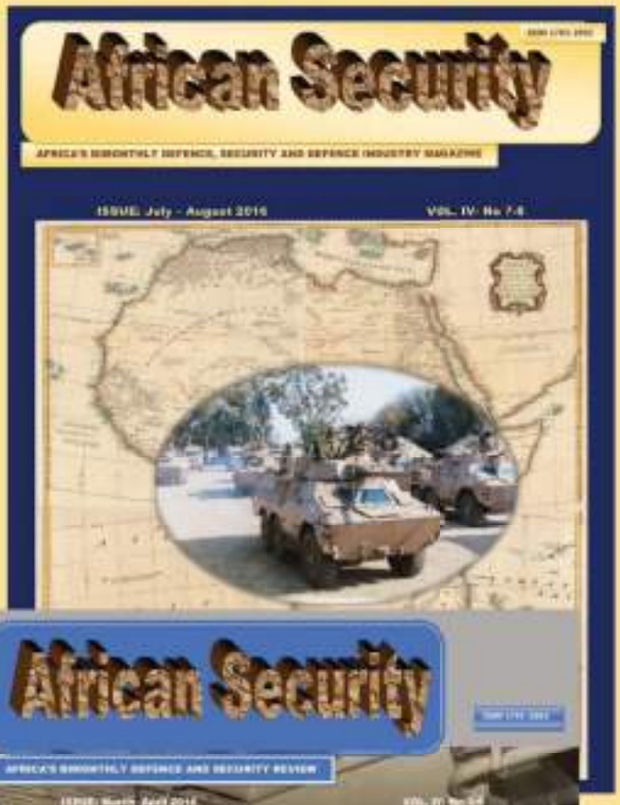

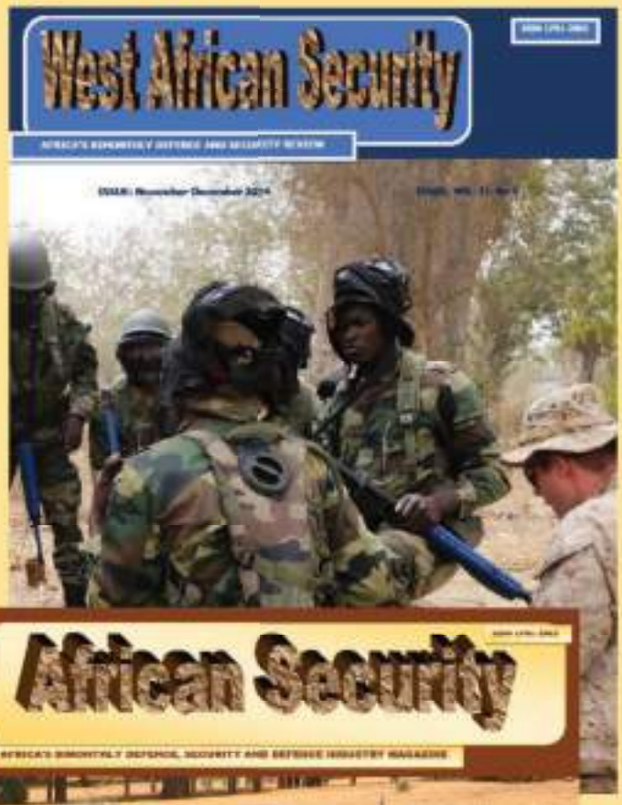

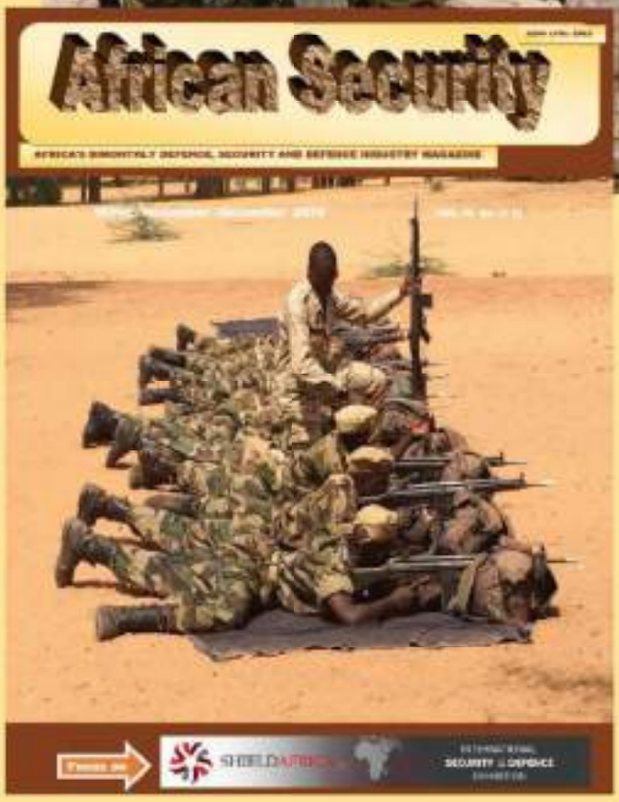

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