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AFRICA DEFENSE FORUM

TECHNOLOGY TRANSFORMS THE BATTLEFIELD

Militaries Race to Adopt New Tools and Stay Ahead of Adversaries

'Made in Africa' Drones Take Off

PLUS

A Look at the Causes and Consequences of Coups in West Africa

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ON THE COVER
Technology is transforming the battlefield, and African militaries are racing to stay ahead of adversaries.

STAFF SGT. WILLIAM COWLEY/U.S. ARMY

VIEWPOINT

Technology is transforming the battlefield. Men and women in uniform today know they have to stay up to date with the latest advances because if they don't, their adversaries will.

Innovations such as drones and artificial intelligence (AI) serve as force multipliers that give security professionals greater reach and capacity to defend their homeland. But these tools are only as good as the people who operate them. Each can be turned against the public and cause great harm.

About 31 militaries in Africa now operate drones. These affordable tools are deployed for surveillance, to secure borders and to stop illicit trafficking. Highly trained pilots can operate armed drones and destroy terrorist targets with lower risks to uniformed personnel and civilians.

AI is another technology with widespread security applications. It can help professionals sift through mountains of data to find valuable intelligence. It can streamline logistics and predict when maintenance is needed to prevent vehicle breakdowns. It also can improve wargaming, helping analyze possible outcomes of military campaigns and strategies. AI tools also can be harmful. Autonomous weapons could be programmed to make terrorist attacks more lethal. AI can enable malign actors to spread misinformation and create videos that deceive the public and sow chaos.

Cyber connectivity has improved nearly every facet of a Soldier's life. Today's battlefield is fully connected with information shared in real time to improve results and save lives. But this same connectivity can be a liability when bad actors steal data or paralyze the armed forces with a cyberattack.

When approaching technology, delay favors the enemy. Militaries must recruit and train tech-savvy Soldiers who will be ready for the next generation of warfare. Soldiers must adopt and master new technology before their adversaries can. Safeguards also must move at the speed of innovation to make sure the newest weapons stay in the right hands and are used for the right purposes. By being forward-looking, African security professionals can win this fight, and the technological advances of today will help provide security tomorrow.

U.S. Africa Command Staff

A member of the Botswana Defence Force trains with night vision goggles.

STAFF SGT. SEAN CARNES/ U.S. AIR FORCE

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'Let Us Stand United, Hand in Hand'

Dr. Mokgweetsi E. K. Masisi, president of Botswana, spoke at the opening ceremony of the African Chiefs of Defense Conference in Gaborone, Botswana, on June 25, 2024. His remarks have been edited for length and clarity.

Nigerian Commodore Chikaji Isah, left, Liberian Brig. Gen. Davidson Forleh and Nigerian Brig. Gen. Raymond Utsaha attend the African Chiefs of Defense Conference.

CPL. ADDYSYN TOBAR/U.S. MARINE CORPS

As you gather here today under the theme, "On the Rampart Together: Expanding Cooperation and Sharing Values," you are called upon to reflect on the critical importance of unity and collaboration in addressing the challenges facing our continent. Now, more than ever before, it is imperative that we come together as one cohesive force to achieve the African Union's noble vision of "Silencing the Guns by 2030" and ensuring peace and stability across our continent as espoused in the African Union's "Agenda 2063: The Africa We Want."

Furthermore, there is an urgent need to face the growing disquiet about the disrespect of the democratic ideal of constitutionally elected governments on the African continent by the military.

In a democracy, we must uphold the principle that the military serves the nation through an elected government and not any particular regime. We must be committed to ensuring that our armed forces remain dedicated to the protection and well-being of our people through governments.

Cooperation among African states is not a choice; it is required if we are to achieve our developmental goals and realize the enormous potential that exists inside our borders. However, achieving this requires more than just lofty aspirations. It demands concrete action and a commitment to good governance and exemplary leadership.

These threats of rampant militarization of our nation states do not only undermine stability and prosperity but also pose significant obstacles to the realization of our collective aspirations for peace and development. Therefore, it is incumbent upon us to bolster cooperation, coordination and intelligence-sharing mechanisms to effectively counter these threats and ensure the safety and security of our nation states.

Let us not forget that the foundation of any successful national endeavor lies in good governance and effective leadership. Without transparency, without accountability and the effective rule of law, our efforts to achieve peace and development will be in vain.

Together we can overcome the obstacles that stand on our way. Together we can build a brighter and more prosperous future for all and every African. Let us stand united, hand in hand, on the rampart of expanding cooperation and shared values as we work tirelessly to silence the guns and pave the way for peace, progress and prosperity across our beloved continent.

I wish to extend my sincere wishes for productive and fruitful discussions during this conference. May your deliberations be characterized by mutual respect, open dialogue and a spirit of cooperation. You must seize this opportunity to forge consensus, exchange best practices and chart a course toward a safer, more prosperous Africa for generations to come.

Let me, on behalf of Botswana, conclude my remarks by expressing our appreciation to all the 42 countries represented here today, for honoring the invitation to this year's African Chiefs of Defense Conference.

Left: Brig. Gen. Abdelkrim Nejjar of the Royal Moroccan Armed Forces, left, and Vice Adm. Jacquy Honoré Ga of Madagascar confer at the African Chiefs of Defense Conference in Gaborone, Botswana, on June 26, 2024.

CPL. ADDYSYN TOBAR/U.S. MARINE CORPS

This C-130H Hercules aircraft will add airlift capability to the Botswana Defence Force.

STAFF SGT. JENNIFER HEALY/ U.S. AIR FORCE

African Defense Chiefs Gather to Forge Cooperation

ADF STAFF

Botswana Defence Force Commander Lt. Gen. Placid Segokgo was eager to host the 2024 African Chiefs of Defense Conference in his home country in June 2024, making it the first African nation to do so.

"Your presence here today demonstrates your commitment to ensuring not only continental peace and security but also world peace and security, which are fundamental to sustainable social economic development," Segokgo said in an opening ceremony address to 34 defense chiefs. "[This] conference offers military leaders an opportunity to learn from fellow commanders' personal experiences from various military engagements that target Africa's wide-ranging challenges and opportunities."

United States Africa Command (AFRICOM) co-hosted the event in Botswana's capital, Gaborone, on June 25 and 26. The conference brought together top military leaders from Africa and around the world to exchange knowledge, encourage partnerships, and foster collaboration toward addressing shared security and stability.

Countering terrorism is a top military priority, with a major focus on the Sahel and its expanding violent extremist organizations, some of which are linked to al-Qaida and the Islamic State group.

U.S. leaders in attendance, including Chairman of the Joint Chiefs of Staff Gen. Charles Q. Brown and AFRICOM Commander Gen. Michael Langley, concurred with their African counterparts on an overarching strategy of communication and collaboration to deter threats and respond to crises.

Speaking during the opening ceremony, President Mokgweetsi Masisi of Botswana highlighted the need to "face the growing disquiet about the disrespect of the democratic ideals of constitutionally elected governments on the African continent by the military."

"This kind of regression in the continent's political order poses a serious threat to the stability of nations."

Segokgo also underscored the importance of civilian and military relations.

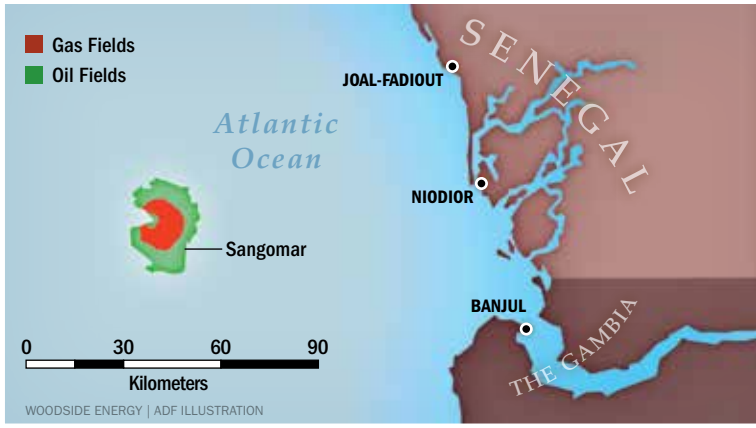
"It is imperative that as defense chiefs we redouble our efforts to ensure that the security sector is not only effective but also accountable and operates within a framework of democratic civilian oversight, the rule of law and respect for human rights," he said.

As the conference ended, U.S. officials transferred a former U.S. military C-130H Hercules aircraft to the Botswana Defence Force in Gaborone. The plane will enhance Botswana's airlift capability.

President Bassirou Diomaye Faye has announced that Senegal will review all oil and gas contracts with foreign companies.

THE ASSOCIATED PRESS

Senegal Joins Oil-Producing Nations



WOODSIDE ENERGY | ADF ILLUSTRATION

ADF STAFF

Senegal in June 2024 joined the ranks of oil-producing nations in Africa, with output expected to be up to 100,000 barrels per day and revenues expected to approach $1 billion a year for three decades.

President Bassirou Diomaye Faye, who was elected in April 2024, said profits from oil and natural gas sales will be "well managed," and he told students in June that an "inter-generation fund" had been set up to benefit them and generations to come, according to Agence France-Presse.

Australia's Woodside Energy holds 82% of the Sangomar oil and gas field being developed off the coast about 100 kilometers south of Dakar. State-owned energy company Petrosen holds the rest. Work started in the field in early 2020, and the first barrels of oil were extracted on June 10, 2024.

This first phase of development will target 230 million barrels of crude oil, Reuters reported.

It's expected to cost $4.9 billion to $5.2 billion to extract oil from Sangomar, according to Turkish news site TRT Afrika.

"We have never been so well positioned for opportunities for growth, innovation and success in the economic and social development of our nation," Petrosen General Manager Thierno Ly told the BBC.

Sangomar is a deepwater field, where extraction involves drilling into the ocean floor, according to TRT Afrika. Even with the 100,000-barrel-per-day output, Senegal will produce far less that nations such as Algeria, Angola, Libya and Nigeria, all of which produce more than 1 million barrels per day.

Modified Mosquitoes Released in Djibouti to Fight Malaria

ADF STAFF

Djibouti became the first nation in East Africa, and the second on the continent, to release genetically engineered mosquitoes in the continuing fight against malaria.

It was the pilot release of "Friendly" Anopheles stephensi mosquitoes arranged through a public-private partnership between the government and Oxitec, a United States-owned developer of biological solutions to control pests that cause disease. Oxitec is headquartered in the United Kingdom.

The effort is aimed at curbing the invasive mosquito, which is responsible for a dramatic increase in malaria in Djibouti's capital city, from near-eradication in 2012 to more than 73,000 cases in 2020.

Tens of thousands of the genetically modified male mosquitoes were released in Djibouti in an effort to stop the spread of an invasive species that transmits malaria. They carry a gene that kills female offspring before they reach maturity, the BBC reported. Only female mosquitoes bite and transmit malaria and other diseases.

"We have built good mosquitoes that do not bite, that do not transmit disease," Oxitec head Grey Frandsen told the BBC. "And when we release these friendly mosquitoes, they seek out and mate with wild type female mosquitoes."

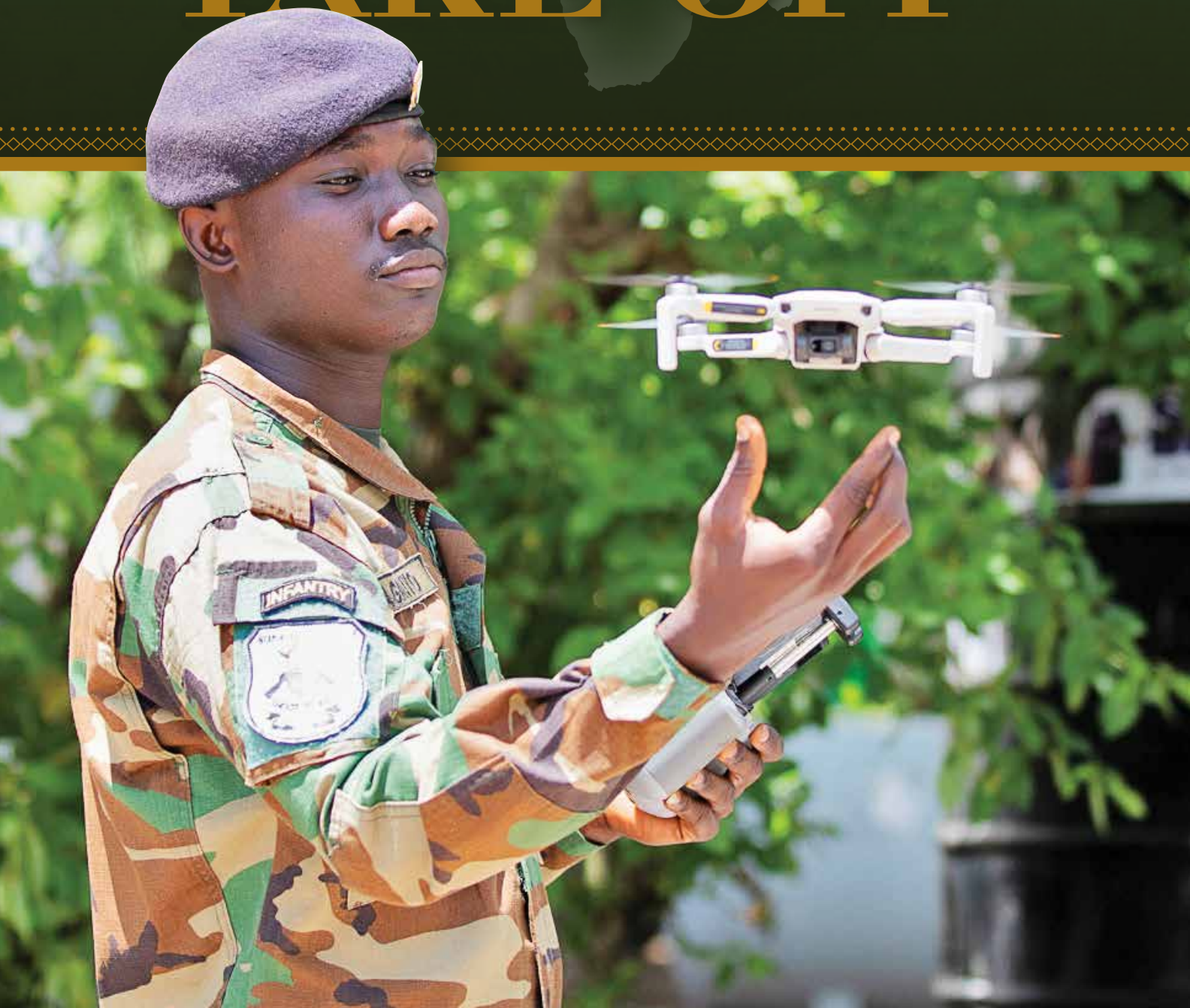
Invasive Anopheles stephensi mosquitoes originated in Asia and are known as urban mosquitoes. They are difficult to control because they bite day and night and are resistant to insecticides, the BBC reported. They also have been found in Ethiopia, Ghana, Kenya, Nigeria, Somalia and Sudan.

"Our government's objective is to urgently reverse malaria transmission in Djibouti, which has spiked over the last decade," Col. Dr. Abdoulilah Ahmed Abdi, health advisor to the president of Djibouti, said in an Oxitec news release. "Today's launch is a significant national milestone, but what's even more exciting is the potential the solution has for the region and entire African continent."

The program is a partnership between Djibouti's National Malaria Control Program, the public health not-for-profit Association Mutualis and Oxitec.

'Made in Africa'

DRONES TAKE OFF



A Boom in the Continental Drone Industry Promises Lower Costs and Improved Security – With Risks

ADF STAFF

On a runway at an undisclosed location in South Africa, the Milkor company marked a milestone. On September 19, 2023, the Milkor 380, a medium-altitude long-endurance unmanned aerial vehicle, took to the skies for the first time.

The flight of the UAV, with a wingspan of 18.6 meters, put South Africa in an elite group of about 10 countries worldwide capable of producing a drone of that size and sophistication.

"This is officially the largest UAV that has ever been produced, developed, flown and tested on the African continent," said Milkor Communications Director Daniel du Plessis.

With a maximum range of 4,000 kilometers and endurance of 35 hours, the UAV is ideal for intelligence, surveillance and reconnaissance (ISR) missions. With a payload of 220 kilograms, it also can carry weapons paired with a camera system to identify, track and engage a target and assess the mission afterward.

Perhaps the most exciting aspect of the launch is that 95% of the components of the Milkor 380 were developed locally. This is a major advance from previous generations of drones that relied heavily on foreign-manufactured parts.

"I think that's one of the main things that makes this project so remarkable, is that many countries, be it developed or non-developed … they've struggled to put together the entire package of having a fully localized solution," du Plessis said. "And we have done that."

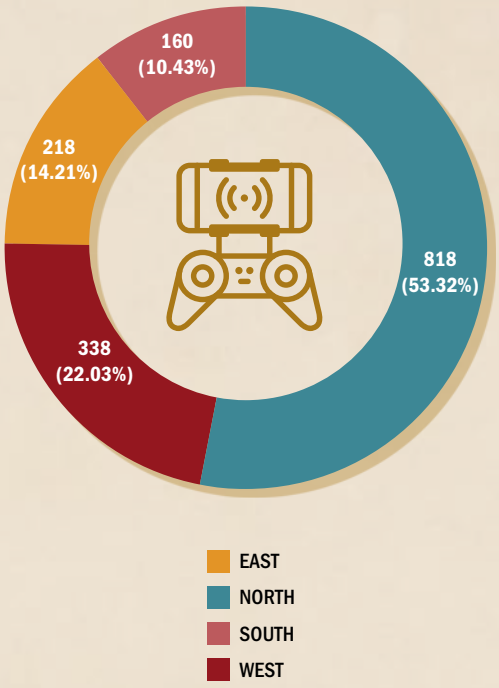
Milkor is not alone. The drone industry on the continent is booming with 13 African companies producing at least 35 models, according to data compiled by the security website Military Africa. Drones are used for border surveillance, to monitor poaching and illegal fishing, and to deliver medicine or other goods to remote regions. Advocates believe this growth in the drone sector will lower prices and allow African manufacturers to develop models suited for the unique conditions and security challenges of the continent.

Left: A Ghanaian Soldier retrieves a drone that was used as part of a mock base attack demonstration.

STAFF SGT. WILLIAM COWLEY/U.S. ARMY

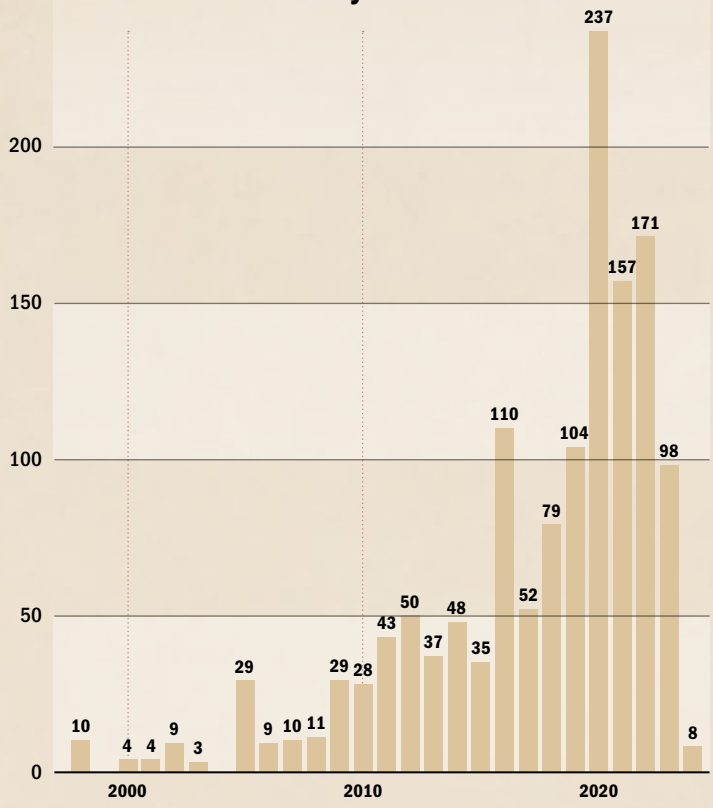
With a wingspan of 18.6 meters and a maximum range of 4,000 kilometers, the Milkor 380 is the largest and one of the most sophisticated drones ever designed and built in Africa. MILKOR

Drone Purchases by Region



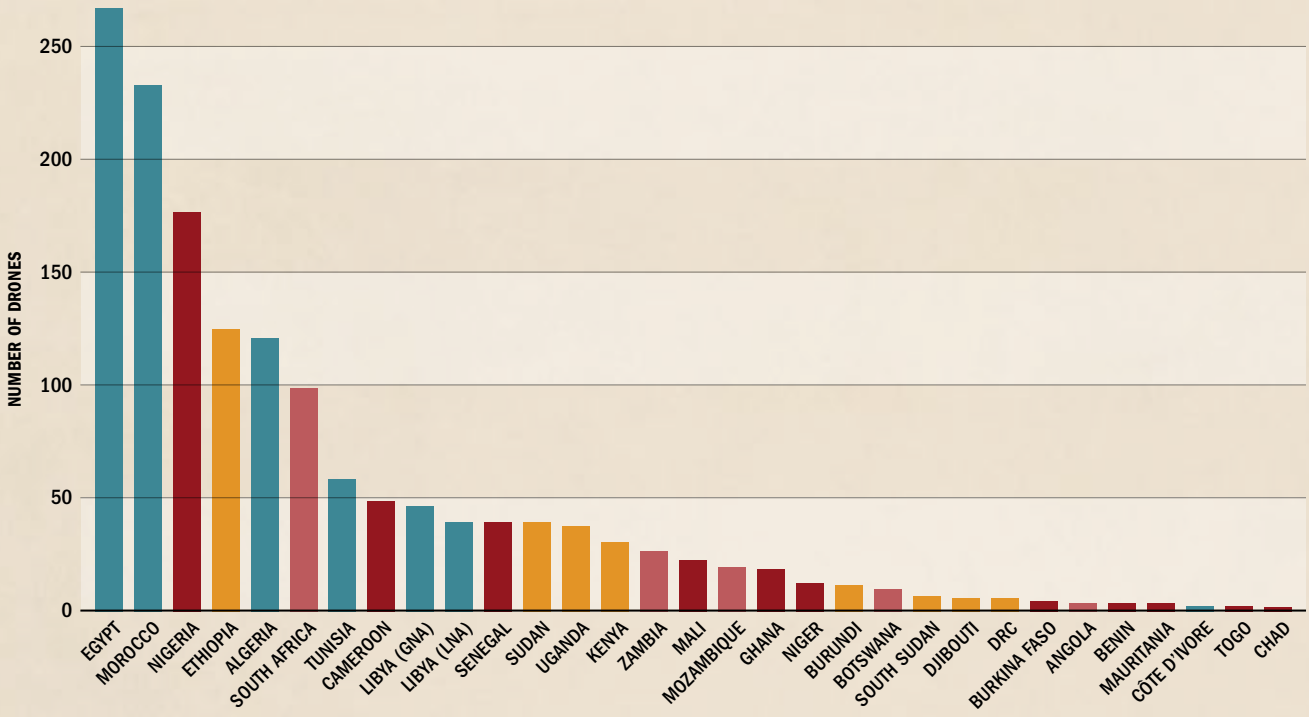
Source: Military Africa

Number Purchased by Year



Source: Military Africa

Drone Purchases by Country, 1980-2024



Source: Military Africa

But the rise comes with risks as well. In 2023, civilian deaths from drone and air strikes jumped to 1,418 compared to 149 in 2020, according to data from the Armed Conflict Location & Event Data Project. Extremist groups also covet drones. Al-Shabaab in Somalia, the Islamic State West Africa Province in Nigeria and terror groups in Mozambique have used off-the-shelf drones for surveillance and to make propaganda videos. Evidence shows that terrorists, particularly those linked to the Islamic State group (IS), plan to weaponize commercial drones.

Experts say the rise of the African drone sector must be matched by oversight, rules and safety measures.

"This democratisation of relatively affordable technology means that [drones] can be used for nefarious ends both in wartime and peace," warned researcher Karen Allen, writing for the Institute for Security Studies (ISS). "The continent presents a vulnerable environment where weaponised drones may be tested and used by militaries and insurgents alike."

A Need for Local Solutions

The first African-made drone emerged from research in the mid-1970s by South Africa's government-funded Council for Scientific and Industrial Research and the defense manufacturing company formerly named Kentron. The Champion took flight in 1977 and was used by the military in the former Rhodesia for surveillance and later acquired by the South African Air Force.

At least 31 African militaries now operate drones with as many as 200 new drones added each year to military fleets. Domestically manufactured drones are still fairly rare, making up only about 12% of the total fleet. Leaders in the domain include companies in Egypt, Ethiopia, Kenya, Nigeria, South Africa and Sudan.

Members of the Tunisian Armed Forces use a drone in Bizerte, Tunisia. STAFF SGT. IAN SAFFORD/U.S. ARMY

A member of Gabon's EcoGuards uses a mapping drone during a one-week course taught by the U.S. 83rd Civil Affairs Battalion.
U.S. DEPARTMENT OF DEFENSE

Above: Nigeria's Tsaigumi UAV was one of the first drones designed and built in the country in an effort led by its Air Force Institute of Technology. NIGERIAN AIR FORCE

A Nigerian military technician works on the Gulma, a predecessor to the Tsaigumi. NIGERIAN AIR FORCE

Ekene Lionel, the director of Military Africa, did extensive research on the industry and compiled a list of all UAV purchases by African militaries between 1980 and 2024. When studying trends, he found several factors pushing African countries to invest in domestic manufacturing capacity:

- **COST:** Local production can reduce costs associated with import taxes, shipping and currency exchange rates.
- **CUSTOMIZATION:** Domestic manufacturers can tailor drones to specific regional needs, climate conditions and operational requirements.
- **SELF-SUFFICIENCY:** Countries believe their national security is bolstered when they don't need to rely on foreign suppliers for drones or drone parts.
- **TECHNOLOGY TRANSFER:** Building drones locally allows for knowledge transfer, skill development and technological advancements within the country.
- **FASTER DEPLOYMENT:** Domestically developed drones can be in the hands of security professionals and used faster than those ordered from abroad.

In his research, Lionel heard excitement and pride in the continent's burgeoning drone sector.

"Perhaps the part that interests me the most is the fact that a robust domestic arms industry strengthens a country's military deterrence," Lionel told ADF. "By producing our own advanced weaponry, we can ensure a reliable supply, tailor equipment to our specific needs and maintain a state of readiness against potential threats."

Lionel also believes drone technology, originally developed for security purposes, can spawn all sorts of new applications. Drones are being used for mapping, medicine delivery and spraying crops. The drone market is expected to triple between 2022 and 2031.

"Investing in local arms production creates jobs, fosters skill development and stimulates various industries, from manufacturing to research and development," Lionel said.

"Such efforts drive advancements in engineering, materials science and other high-tech industries, which can have spillover effects, benefiting other sectors of the economy."

Defense Innovators

The private sector is leading the way in drone innovation, but in some cases, African militaries are getting into the research and development business. Nigeria's Air Force Institute of Technology is the second-largest drone manufacturer on the continent and has produced 20 units since production began in the early 2000s, according to Military Africa.

In 2018, it unveiled the Tsaigumi UAV, developed in collaboration with Portugal's UAVision. With its wing mounted above the fuselage, it can fly at heights of up to 4,600 meters and has a mission radius of 100 kilometers. It was created for tasks such as ISR, maritime patrol, pipeline and powerline monitoring, weather forecasting, and monitoring wildlife habitats for poachers.

Nigeria has logged the continent's third-highest number of military drone purchases with 177 and is one of the few countries to host its own UAV pilot training school.

During the annual Africa Air Forces Summit in Abuja in 2024, Nigerian Air Marshal Hasan Abubakar, chief of Air Staff, said his country wants to be an innovation leader in the fields of UAVs, small arms, rockets and radar. He pointed to the recent establishment of the Air Vehicle Development Centre, which will allow the country to develop and manufacture aeronautic components domestically.

"To sustain its competitive edge in the ever-evolving security landscape, the [Nigerian Air Force] has embarked on a robust R&D drive to keep pace with emerging technologies and their application in modern warfare," Abubakar said.

Morocco, which boasts the second-largest military drone fleet on the continent, also is looking to produce the aircraft. In March 2024, it announced it would partner with Israel Aerospace Industries and create a production plant to domestically produce UAVs. The facility in Rabat will produce WanderB and ThunderB models, which are primarily used for ISR, according to a report by Le Monde.

The Danger of the Boom

Although the majority of UAVs being developed and built in Africa are for surveillance, armed drones also are on the menu. Nigerian manufacturers have two in the protype stage — a six-armed helicopter UAV armed with a 250-kilogram bomb and an Ichoku tactical loitering munition. Egypt has built the armed EJune-30 drone, which can fly for 24 hours, and Sudan has built a Kamin-25 loitering munition drone.

Foreign-built weaponized drones have been used in conflicts in Ethiopia, Libya, Nigeria, Sudan and elsewhere.

Lionel said this aspect of drone manufacturing is bound to grow "exponentially" in coming years, and AI-enabled and semiautonomous drones produced in Africa might not be far off.

A drone pilot from the Royal Moroccan Armed Forces describes how the Bluebird WanderB-VTOL drone can be used to fight wildfires. Morocco has entered into an agreement to domestically produce the drones. UTAH NATIONAL GUARD

There is a looming danger that terror groups will acquire drones. In Somalia, al-Shabaab has used drones for surveillance and experts fear other groups plan to use drones to attack military and civilian targets. Cost is not a barrier to acquiring these tools. The most common drone used by IS in attacks in the Middle East is the DJI Phantom, which can be bought on Amazon for $400 to $500.

"What we've seen with small commercial drones is that, when utilized by otherwise underequipped, underresourced, undertrained groups, those organizations are much more effective," reporter Heather Somerville said in a Wall Street Journal podcast. "And they can wreak havoc on even strong sophisticated militaries."

Allen of the ISS said governments must examine how to create registration systems for drones and mechanisms to flag the delivery of bulk purchases of hobbyist drones.

"While tighter regulations won't necessarily prevent the nefarious uses of drone technology, they can provide early warning signs," Allen wrote. "Given the broad applications of drones, it will need an approach in which government departments coordinate their responses."

Militaries and police agencies also will need to develop strategies to protect vulnerable sites, including airports, energy plants and communications infrastructure. They will need to invest in counter-UAV technology to improve their ability to track drones in the air and shoot them down when they pose a threat.

"Personally, I believe it is an inevitability that nonstate elements would, in time, get their hands on commercially available drones, which they would weaponize," Lionel said. "African security professionals should be proactive in mitigating this threat." ❑

NIGERIAN AIR FORCE

'An Agile and Resilient Force'

A Conversation With Air Marshal Hasan Abubakar, Nigeria's Air Force Chief of Staff

Air Marshal Hasan Abubakar has served in the Nigerian Air Force (NAF) for more than 30 years. A pilot with more than 4,500 flying hours, he has served as the officer commanding 'B' Squadron and commanding officer Base Services Wing at 81 Air Maritime Group. He spent much of his career at the 88 Military Airlift Group in Ikeja. He also served as the fleet operation officer and later as the commander of the 011 Presidential Air Fleet in Abuja. Internationally, he was a team leader for the United Nations mission in the Democratic Republic of the Congo. In June 2023, he was appointed chief of air staff. The NAF released this interview with Abubakar through Coral Coast Public Relations during the African Air Forces Forum in May 2024. It has been edited for space and clarity.

***Q:** The Nigerian Air Force is marking its 60th anniversary. What are some of its noteworthy achievements?*

A: Indeed, the Nigerian Air Force has come of age, having undergone significant transformation in its organization, manning and equipment. At inception in 1964, the service was barely able to carry out its primary responsibilities of defending the nation from the air, due to the few platforms that were available. Up to 1970, the service relied solely on foreign partners such as the German Air Force Assistance Group for technical and nontechnical training. Nevertheless, the service was still able to participate in the Civil War, which started in 1967, and it rose up to the challenge in spite of its infancy. Over the years, particularly during its formative years in the 1970s up to 1990, the NAF underwent upgrades in platforms and equipment, while new ones were also acquired. The service further experienced reorganization of its force structure, while bolstering its training and aircraft maintenance capacity. Between 1990 and 2000, the NAF underwent some expansion as it established new commands and formations, increasing its presence across Nigeria. Perhaps the most

Cadets stand on the Nigerian Defence Academy Parade Ground in Afaka. NIGERIAN AIR FORCE

noteworthy achievements of the NAF have been recorded in the era beginning in 2000. The NAF contributed greatly to restoring peace in Liberia, Sierra Leone, The Gambia and Mali. The service has acquired significant technical and nontechnical capabilities and now has the capacity to conduct most of its training in-country. The service's foray into the use of unmanned aerial systems (UAS) and the increased use of precision-guided munitions has revolutionized our contributions to the counterterrorism and counterinsurgency efforts. With its current array of available and expected platforms, the NAF can confidently boast a balanced tactical force that can effectively safeguard Nigeria's sovereignty, ensure her national security, and contribute to peacekeeping missions both regionally and globally.

Q: How has the Nigerian Air Force adapted to evolving security threats, particularly regarding counterterrorism and border security?

A: Hitherto, the NAF was largely trained and equipped to conduct conventional warfare and operations in the execution of its primary role of defending the territorial integrity of a united Nigeria from the air. However, events of the last decade or thereabouts of NAF's involvement in asymmetric warfare dictated the need for a change in approach to address unconventional threats from nonstate actors. In adapting to these threats, the NAF had to overhaul its training curricula to accommodate the tactics employed by nonstate actors. The service also focused on force protection of its troops and assets by increasing the training and employment of NAF regiment/special operations forces personnel. These well-trained personnel embarked on ground offensives to search, find and neutralize these criminals by taking the war to them. The induction of new platforms such as helicopters, manned and unmanned surveillance platforms, unmanned combat aerial vehicles and ground attack platforms such as the Super Tucano aircraft have all been part of our adaptation strategy that gives the NAF the technological edge over the nonstate actors.

Q: How does the Nigerian Air Force prioritize innovation and make use of the latest technology?

A: To sustain a competitive edge in the ever-evolving security landscape, the NAF has embarked on a robust research and development drive to keep pace with

Abubakar speaks during the African Air Forces Forum in Abuja in May 2024. NIGERIAN AIR FORCE

Abubakar tests an aircraft simulator during a visit to the Egypt International Air Show at El-Alamein International Airport.

NIGERIAN AIR FORCE

emerging technologies and their application in modern warfare. To this end, the NAF, through its Air Force Institute of Technology and Air Force Research and Development Centre, collaborates with institutions in the areas of UAV, small arms and rockets development, as well as radar development. At the moment, we are partnering with some organizations to establish an air vehicle development center. The initiatives are aimed at providing the NAF with the requisite technological edge to optimally operate and maintain the sophisticated platforms and equipment in its inventory.

Q: What are the Nigerian Air Force's strategies regarding flight simulation and training?

A: We have several flight simulators for different aircraft types in our inventory. The employment of these simulators over the years has proved to be both operationally effective and efficient, as the NAF has produced pilots who have proved themselves to be highly professional. Flight simulation has also been cost-saving and time-saving. Furthermore, the use of flight simulators has improved safety and enhanced professionalism.

Q: What is the NAF implementing to adapt to the evolving landscape of aerial warfare and defense, particularly with the introduction of UAS and other disruptive technologies?

A: The NAF has recently reinvigorated its platform acquisition drive due to increased commitments in combating internal security challenges and the need to maintain a balanced and modern air force. Based on this, I set out my command philosophy to transform the NAF into an agile and resilient force that effectively meets the airpower demands of national security in all operational environments. Achieving such agility and resilience also

Abubakar greets Airmen during a tour of Nigerian Air Force units in Plateau State.

NIGERIAN AIR FORCE

Nigerian Air Force planes fly in formation above a military parade in Abuja celebrating the country's independence.

AFP/GETTY IMAGES

demands the right mix of platforms. Accordingly, certain changes have been made in our platform procurement strategies, drawing lessons from ongoing engagements and projecting into the future. The service is inducting more UAS with precision-strike capabilities to minimize collateral damage during internal security operations. The induction of more attack and utility helicopters is another area where the NAF is looking to consolidate its efforts in order to meet the battlefield demands of the surface forces and also maintain a considerable agility and fighting edge over the insurgents. In the area of fighter ground attack platforms, the service is considering modernization to overhaul its aging fleets for a more agile and potent air force. This is also followed by a decent investment into acquisition of requisite air defense assets and capabilities necessary to secure our nation from the air. In order to sustain requisite resilience and keep up with the maintenance of the array of modern platforms being inducted into the service, we have made arrangements to also mobilize the original equipment manufacturers for prompt delivery of services to ensure a high level of aircraft and equipment serviceability in the NAF.

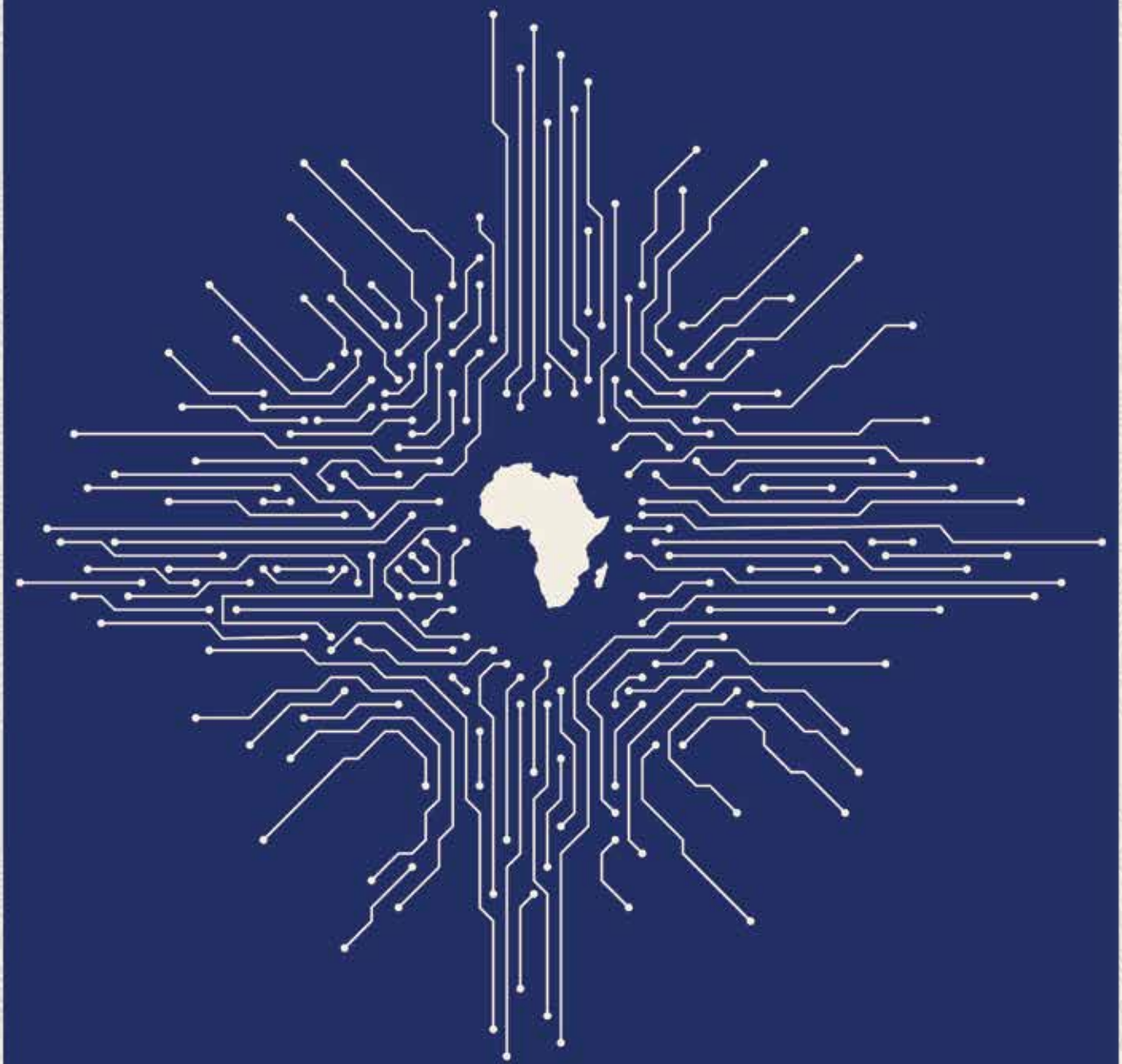
Q: What initiatives are being pursued for the well-being and professional advancement of NAF personnel, particularly regarding training and career development opportunities?

A: Training is an area that the NAF considers very seriously, because it is our belief that any machine is only as good as the man behind it. To this end, we have embarked on a range of robust training initiatives. This is underpinned by one of the key enablers of my command philosophy, which is deliberate training and mission-oriented force development. Already we have sustained the training of our personnel both locally and internationally. At the moment, many personnel have either recently completed or are undergoing various training courses in-country. In terms of foreign training, hundreds of our personnel are attending a variety of courses abroad. Apart from flying-related courses, these individuals are also being trained in fields cutting across logistics, aircraft maintenance, safety and communications, among others. As part of the initiatives, we had made a request to foreign defense attaches in Nigeria for more training slots, particularly for pilot training, specialized and advanced maintenance training, as well as continuous professional military training to bridge identified skills gaps in the NAF. Another initiative is the complete overhaul of our basic military training to focus on graduating high-quality trained airmen and airwomen. We have begun a holistic assessment and review of the course curriculum, training facilities and infrastructure to identify and address gaps in all training institutions.

Q: In what ways does the NAF contribute to broader initiatives aimed at improving regional cooperation and collective security across Africa?

A: The NAF has contributed to regional cooperation initiatives under the auspices of organizations such as the United Nations, African Union and the Economic Community of West African States. Through its numerous deployments, the NAF has contributed to the furtherance of the Nigerian government's commitments and willingness to combat national and regional threats to peace and security in Nigeria, West Africa, the Gulf of Guinea and the entire African continent. The NAF also is cooperating with neighbors in the conduct of ongoing counterterrorism and counterinsurgency operations. We are doing this as part of the Nigerian contingent through the Multinational Joint Task Force. ❑

MILITARIES GRAPPLE WITH POWER OF AI



ADF ILLUSTRATION

Using Artificial Intelligence for Defense Is the Next Step in Africa's Military Tech Development

ADF STAFF

In 2016, Rwanda became the first nation in the world to use drones to deliver medicine and blood samples. Now, the country uses artificial intelligence (AI) to efficiently schedule the drones' pickups and deliveries.

In many ways, Africa is breaking new ground in AI use. In South Africa, drones monitor weeds, while in Mauritius, computers crunch health data for better patient outcomes. In Nairobi, surveillance systems work to control chaotic city traffic. Ghanaian cashew farmers use drones to detect tree diseases. In South Africa, a company is digitizing African languages so AI-powered software such as Google Translate can boost connectivity. AI is being used to monitor climate change, droughts, water supplies and locust infestations.

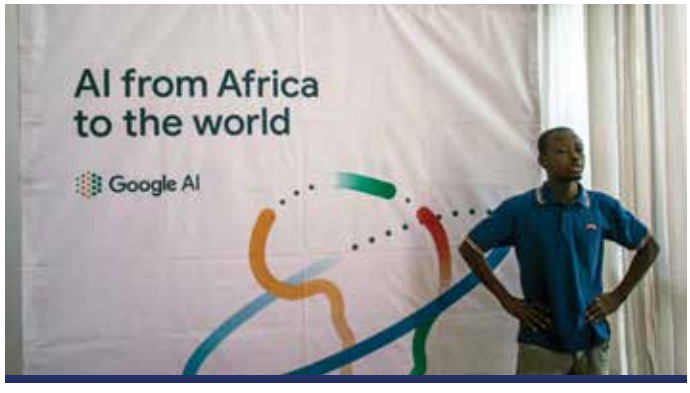
AI is defined as the use of computer systems to carry out tasks that ordinarily require human learning, planning or reasoning.

African consumers, educational institutions, governments and companies are rapidly adopting AI to aid in content creation, improve the delivery of public services and streamline business processes. In the realm of peace and security, AI can enable more effective conflict analysis and early warning, reports Amani Africa, a research site based in Ethiopia.

"AI-driven technology can also enable state institutions to enhance their capacity for enforcing law and order and fighting criminality, thereby contributing to the security of citizens," Amani noted in a June 2024 report. "Indeed, AI-driven surveillance and policing platforms are deployed for tracking organized criminal networks and responding to or preventing the activities of terrorist or insurgent groups."

Kenya's Ministry of Defence acknowledged the challenges in June 2024 when it co-hosted an inaugural workshop with the Netherlands and South Korea on the responsible use of AI in the military. Delegates and military personnel heard about the opportunities, challenges and risks associated with AI military applications. African countries at the conference were Burundi, Cameroon, Egypt, Ethiopia, Ghana, Morocco, Namibia, Rwanda, Senegal, South Africa, Tanzania and Uganda.

At the workshop, Kenya Cabinet Secretary for Defence Aden Duale said that in the future, AI will not only strengthen defense capabilities, but also will be part of upholding the "principles of justice, peace and human dignity."



A worker stands in front of a banner during a presentation for the Google Artificial Intelligence research center in Accra, Ghana.

AFP/GETTY IMAGES

Malawi game rangers give an anti-poaching demonstration at Liwonde National Park. Rangers use AI anti-poaching software that could be adapted to track terrorists.

AFP/GETTY IMAGES

"Kenya is committed to ethical AI practices in military operations to promote security and stability in Africa and globally," he said, as reported by the website Military Africa. "I urge you to share your insights and collaborate on solutions that will guide toward responsible and effective use of AI in our military endeavours."

AI DEFENSE CENTER

South Africa has become a leader in AI research, with an AI institute dedicated to the defense and military sector. The Defence Artificial Intelligence Research Unit launched in May 2024 at the South African Military Academy in Saldanha Bay, Western Cape. South Africa already had AI research facilities at the University of Johannesburg in 2022, Tshwane University of Technology in 2023 and the Central University of Technology in February 2024, according to ITWeb.

The defense unit is the first of its kind in Africa. The new hub is a collaborative effort between the country's Department of Communications and Digital Technologies and the Department of Defence and Military Veterans, ITWeb reported.

But South Africa is not alone in AI defense technology. There already have been other advances in AI use by Africa's armed forces and police:

- So far, at least 14 African countries are using AI-driven surveillance and smart-policing platforms. Such information gathering typically relies on deep networks for image classification and a range of machine-learning models for predictive analytics, according to researchers Nathaniel Allen and Marian Okpali, writing for the Brookings Institution.
- In Johannesburg, automated license plate readers help authorities track criminals with suspected ties to the Islamic State group.

- Zambian officials are using AI to combat misinformation during voting. A 2024 survey of 22 African countries by Yiaga Africa revealed that AI is being deployed for voter registration management, automated chatbots for voter engagement, voter authentication, and cyber threat detection.
- At Liwonde National Park in Malawi, park rangers have EarthRanger software to combat poaching, using AI and predictive analytics, according to Allen and Okpali. The software detects patterns that rangers might overlook, such as increases in poaching during holidays and government paydays. "A small, motion-activated 'poacher cam' relies on an algorithm to distinguish between humans and animals and has contributed to at least one arrest," the researchers said. They said it was fair to imagine how such a system might be repurposed for counterinsurgency or armed conflict, "with AI-enabled surveillance and monitoring systems deployed to detect and deter armed insurgents."
- The South Africa-based Paramount Group in 2021 announced the launch of its N-RAVEN drone system, which it bills as "a family of autonomous, multi-mission aerial vehicles featuring next-generation 'swarm' technologies." The N-RAVEN can swarm in units of up to 20 and is "designed for technology transfer and portable manufacture within partner countries."

WHAT AI CAN DO

AI can improve how countries defend themselves in several ways. It can be used to develop and operate advanced weapons systems. Autonomous weapons are a controversial topic in the military. Some experts argue that these systems could reduce the risk to human operators, but others warn of the potential dangers of "giving machines the ability to make life-and-death decisions," Military Africa reports. Such weaponry still relies on a human to make the final call.

Predictive AI can be used to identify a missile's electromagnetic signature and to either jam its signal and redirect it or direct interceptors to destroy it before it reaches its target, reports defense contractor Lockheed-Martin.

AI is proving useful in the development of drone swarms, in which drones or robots are used in large numbers that together accomplish complex tasks. Each of the devices follows simple rules but through their interactions, the swarm exhibits intelligence beyond the abilities of the individual parts. Potential applications include surveillance and combat. "Drone swarms take inspiration from social insects like ants and bees, leveraging swarm intelligence to create a powerful collective entity out of many simple agents," reports technology company Sentient Digital Inc.

Militaries all over the world are using AI

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South Africa-based Paramount Group has announced the launch of its N-RAVEN drone system, which will be able to swarm in units of up to 20. PARAMOUNT GROUP

A 2024 survey of 22 African countries by Yiaga Africa revealed that AI is being deployed for voter registration management, automated chatbots for voter engagement, voter authentication, and cyber threat detection.

Voters line up at a polling station in Soweto in Johannesburg, South Africa, on May 29, 2024. Some African countries are using artificial intelligence to monitor elections for misinformation and fraud.

LATIN AMERICA NEWS AGENCY VIA REUTERS

algorithms to optimize supply chains, reducing waste and improving efficiency. This can help reduce the cost of military operations and improve the speed at which supplies are delivered to the front lines. AI is also useful in predicting maintenance issues and wear and tear on vehicles and other equipment.

One of the fastest-developing military uses for AI is in surveillance, where it can power systems to monitor and analyze large amounts of data from various sources, including moving and stationary drones, cameras, sensors, and other devices to detect and respond to potential security threats. These AI techniques also can be applied to such areas as public safety and transportation. In the future, researchers say, AI managers can use their data to locate terrorists who are targeting critical infrastructure such as power plants and cell towers.

AI-powered weapons can be designed to make decisions based on real-time data, enabling them to respond to changing circumstances in combat. The intent is to reduce the risk of human error and improve the accuracy of attacks. So far, the evidence is clear: AI thinks faster than humans can.

Because AI is a general-purpose technology, it can be used in many bad ways. Chief among these is its increasing use in disinformation campaigns. But it also is used in cybersecurity threats, hate speech targeting women and minorities, and to encourage or incite violence in times of crises and conflicts.

"It is reported that deepfakes involving AI-driven voice and image technologies are used to impersonate political figures for propagating false information in the elections in Nigeria and in the ongoing civil war in Sudan," Amani reported. "AI technologies could also potentially be used to increase cyber-attack capabilities and to design bioweapons and weapons of mass destruction."

The most serious concerns about the abuse of AI involve its use in making warfare decisions.

"AI and machine-learning systems could have profound implications for the role of humans in armed conflict, especially concerning increasing autonomy of weapon systems and other unmanned systems; new forms of cyber and information warfare; and, more broadly, the nature of decision-making," the International Committee of the Red Cross reports.

Researcher Koichiro Takagi says AI developers will have to find ways to deal with the speed at which it makes decisions and adapts.

"When human remotely piloted weapons and AI-autonomous unmanned weapons are pitted against each other, human operators cannot compete with autonomous unmanned weapons which have overwhelmingly fast decision-making speeds," wrote Takagi for Japanese magazine Foresight. "Even if the role of AI is limited to supporting human decision-making and humans make the final decision, there is still a risk of human judgment being dominated by AI."

Kenyan officials hope artificial intelligence can unsnarl Nairobi's notorious traffic jams.
SOPA IMAGES VIA REUTERS

CHALLENGES FOR AFRICA

Authorities warn that the haphazard development of AI in all its forms poses serious risks, and not just for military use. The African Union is preparing an ambitious AI policy that envisions an Africa-centric path for the development and regulation of the emerging technology, MIT Technology Review magazine reports. Current debates hinge on when AI regulation is warranted without becoming a roadblock to innovation. Researchers say a lack of AI infrastructure on the continent could hold back the technology's adoption. Some African countries already have begun to draw up their own AI legal and policy frameworks. Seven have developed national AI policies and strategies, which are at different stages of implementation. A continentwide strategy should be ready to be reviewed in 2025, MIT reports.

AI remains a mystery to many people who see it as able to solve problems on its own but don't realize that it depends on data inputs. Claver Gatete, executive secretary of the United Nations Economic Commission for Africa, says the development of infrastructure, including internet connectivity, is key to tapping the benefits of AI, along with sharing the technology among countries.

"Out of the 1.6 billion people who are not connected, Africa really is one of the biggest places where we are not connected," he said, as reported by the U.N. "If you are not connected you cannot even talk about AI. We need infrastructure, we need energy investment going hand in hand with the IT infrastructure."

The spread of defense AI across Africa, like the broader spread of digital technology, is likely to be diverse and uneven. Africa remains the world's least digitalized region, according to the Brookings Institution.

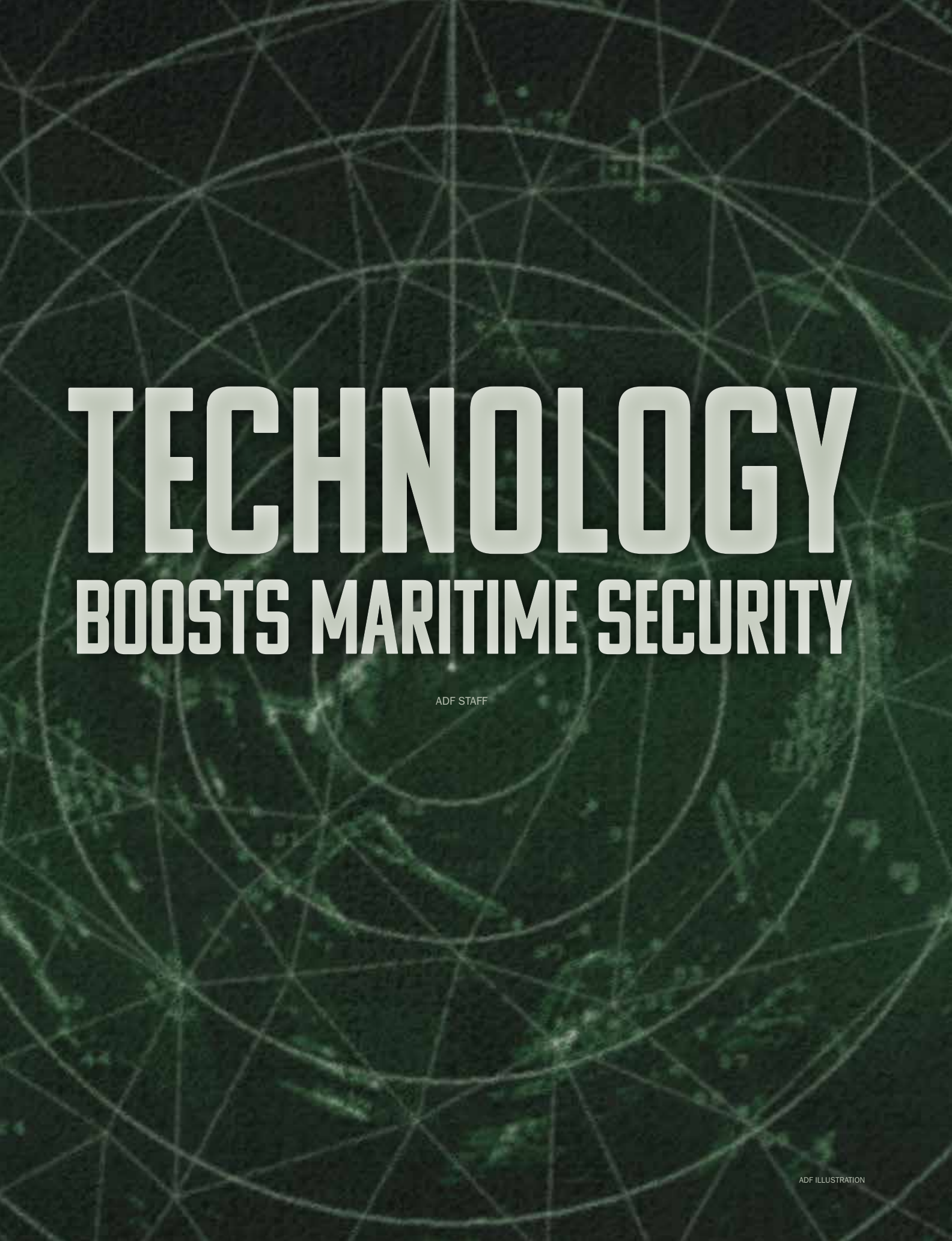
"Internet penetration rates are low and likely to remain so in many of the most conflict-prone countries," the institution reported. "In Somalia, South Sudan, Ethiopia, the Democratic Republic of Congo, and much of the Lake Chad Basin, internet penetration is below 20%. AI is unlikely to have much of an impact on conflict in regions where citizens leave little in the way of a digital footprint, and non-state armed groups control territory beyond the easy reach of the state."

Takagi noted that the future of military AI depends on its thoughtful, intelligent use.

"Throughout history, it has not been the superiority of science and technology itself, but the human intelligence that uses it, that has won or lost wars," he wrote. "Future warfare may be determined not by the science and technology of AI itself, but by the innovativeness of the concepts that utilize it, and by human intelligence and creativity." ❑

TECHNOLOGY BOOSTS MARITIME SECURITY

ADF STAFF



ADF ILLUSTRATION

Advancements and Regional Collaboration Help African Nations Guard Their Coasts

The Nigerian Navy pursued the oil tanker MT Heroic Idun into the Gulf of Guinea. Navy officials suspected the ship of stealing oil from a Port Harcourt terminal. The tanker's crew, mistaking the approaching naval patrol boat for pirates on that day in August 2022, reported themselves under attack and fled.

Using the tools of the Yaoundé Architecture Regional Information System (YARIS), Nigerian authorities contacted their counterparts in Equatorial Guinea, who impounded the ship when it entered their waters and held the crew as suspected thieves.

Although the crew eventually was acquitted of wrongdoing, the incident illustrates how African nations use technology and regional organizations to improve maritime domain awareness (MDA) along the continent's heavily traveled Atlantic and Indian oceans' coasts.

"Nigeria is a prime example of a country where investment in technology-based infrastructure has helped it to tackle threats to security and development," analyst Ifesinachi Okafor-Yarwood wrote recently in The Conversation. Okafor-Yarwood has written extensively about the nexus between technology and maritime security, particularly in the Gulf of Guinea.

Nigeria is a West African maritime security leader. Among its MDA tools, the Falcon Eye system uses a network of radars, electro-optic systems and cameras to track vessel movements. Along with Falcon Eye, the Deep Blue Project includes a fleet of 19 ships, unmanned aerial vehicles, 600 coastal security personnel and a land-based Command, Control, Communication, Computer, and Intelligence Centre to collect data and respond to incidents.

Nigeria credits its effort to monitor and protect its offshore territory for a steep drop in piracy incidents and a delisting in 2022 from a public roster of the world's piracy problem areas.

Nigeria has the capability to fund its own MDA system, but many nations cannot. Regional systems such as YARIS and its Indian Ocean analog, the Djibouti Code of Conduct, improve MDA by encouraging countries to work together to overcome their individual deficiencies.

Despite that, the systems face important challenges,

A Djiboutian Sailor monitors maritime activities during exercise Cutlass Express near the Port of Djibouti. STAFF SGT. VICTORIA SNEED/U.S. AIR FORCE

such as long-term sustainability and building trust with shippers, according to former shipping executive Sam Megwa, who now oversees the Gulf of Guinea Interregional Network, which is working on ways to ensure the future of YARIS.

"We need to foster cooperation and trust," Megwa said during an interview on Okafor-Yarwood's podcast, "AfriCan Geopardy." "If the maritime environment is secure, it benefits everyone."

TECHNOLOGY AND TRUST

Africa's 39 coastal countries are responsible for 48,100 kilometers of coastline, 13 million square kilometers of exclusive economic zones and more than 100 ports — a huge amount of territory that countries historically have struggled to patrol effectively. It's a condition researchers refer to as "sea blindness." The result has been decades of piracy, trafficking and other challenges to the continent's sea-based economy.

"Oceans remain an elusive space for many coastal states due to limited capacity resulting from lack of access to infrastructure, technology and technical know-how," Okafor-Yarwood wrote as the lead author of a study published in the journal "Marine Policy" in early 2024.

The situation has begun to change as technological advancements, including internet-based, land-based and space-based systems, give countries a better understanding of what is happening in their territorial waters.

"The evolution of MDA is intrinsically linked to the rise of technologies promising to enhance states' surveillance capabilities," Okafor-Yarwood and his coauthors wrote in Marine Policy.

Sierra Leonean forces intercept a ship suspected of fishing illegally. Illegal, unreported and unregulated fishing is just one of the many challenges Africa's coastal nations face as they marshal technological innovations and regional collaboration to fight maritime crime.

REUTERS

Technology that African nations have at their disposal includes:

SeaVision: The unclassified MDA tool created in the United States in 2012 requires only an internet connection, username and password. It lets users track commercial vessels globally with data from automatic identification system (AIS) transponders developed to prevent collisions at sea. About 25 African countries use the tool.

Radar: Low-cost land-based radar systems that can see through bad weather give authorities a picture of the ships operating in their waters. However, such systems see small slices of territory at a time and cannot provide the kind of identifying information available from AIS or the vessel monitoring system.

Satellite: Satellite images cover large amounts of territory, but their low resolution makes it difficult to see small vessels. Like radar, they also fail to provide identifying information. Subscriptions can be too expensive for some countries.

Skylight: This internet-based system combines public and private satellite images and AIS data to locate ships and track them at sea with an emphasis on illegal, unreported and unregulated (IUU) fishing.

Synthetic-aperture radar: This high-cost satellite-based radar system provides higher resolution images than land-based radar and can pinpoint vessels' position and activity. It also can track vessels that have disabled their AIS transponders — a tactic common to ships fishing illegally.

Vessel Infrared Imaging Radiometer Suite: This technology detects vessels based on the light they emit, making it particularly effective against IUU fishing vessels

that use lights to attract fish.

Even as maritime technology proliferates, it's no substitute for coordination and collaboration among countries.

"The struggle to patrol is largely caused by a lack of capacity, which could be overcome if authorities would improve joint awareness through shared information," analyst Timothy Walker wrote for the South Africa-based Institute for Security Studies.

That said, information must be shared judiciously in areas where it might encourage corrupt authorities to collude with the same criminals the systems are trying to stop, according to experts.

"This creates a culture of mistrust," Okafor-Yarwood and co-authors wrote in "Marine Policy."

African nations already struggle to instill trust in the commercial shippers that transit their waters. Ships that suspect piracy often report first to groups such as the Malaysia-based International Maritime Bureau rather than to the nearby information centers established by the Yaoundé and Djibouti systems. In many cases, ship captains don't believe African nations will respond effectively, according to researchers.

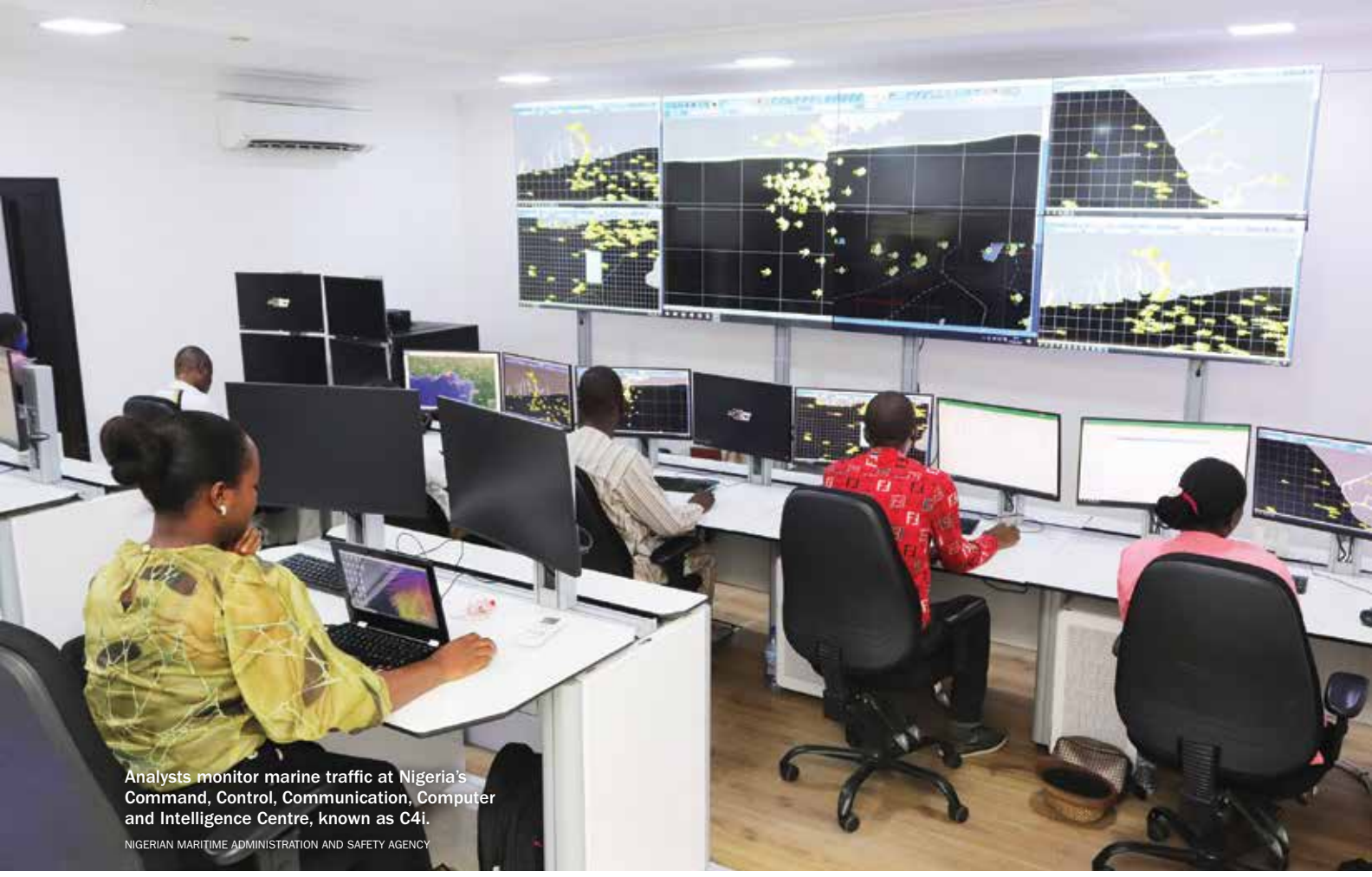
"It goes without saying that contacting the region first would give them the best chance of responding quickly and effectively to ships in distress," Megwa said. "The full potential of YARIS cannot be realized unless there is that information sharing between the ships and the regional centers."

CHALLENGES AHEAD

Collaboration in the maritime environment can overcome the limitations some nations face, particularly those where land-based insurgencies and terrorism force leaders to shift their focus away from the largely out-of-sight offshore areas. For those, the Yaoundé Architecture or Djibouti Code of Conduct can be a vital part of their effort to disrupt maritime crime.

From its founding in 2008, the Djibouti Code of Conduct became the cornerstone of international efforts to rein in piracy in the western Indian Ocean, a region that includes the Gulf of Aden, the Gulf of Oman and the Mozambique Channel, three crucial chokepoints for the global economy.

Coastal radar installations can provide vital information about vessels operating in a country's exclusive economic zone, but their coverage has limits. REUTERS



Analysts monitor marine traffic at Nigeria's Command, Control, Communication, Computer and Intelligence Centre, known as C4i.

NIGERIAN MARITIME ADMINISTRATION AND SAFETY AGENCY

Over the next decade, the 20 signatories — 15 African and five Middle Eastern nations — and their partners reduced piracy levels to virtually zero in the region. In 2022, the International Maritime Organization delisted the Indian Ocean as an area at high risk for piracy.

Although piracy has dropped dramatically, African nations continue to face other ocean-borne challenges. Drug traffickers, for example, have made the continent a key transit route to Europe, from Brazil into West Africa and from southern Asia into East Africa. Africa's Indian Ocean nations alone experience more than $190 million in drug trafficking each year, according to researchers Darshana M. Baruah, Nitya Labh and Jessica Greely with the Carnegie Endowment.

"The movement of drugs and terrorism are connected," the researchers wrote in a 2023 study.

Since 2016, East African regional maritime security forces repeatedly have intercepted Iranian weapons destined for al-Shabaab and the Islamic State group in Somalia.

Africa's Indian Ocean island nations — Madagascar, Mauritius and Seychelles — are responsible collectively for monitoring more than 3.8 million square kilometers of ocean, second only to Australia, making regional cooperation imperative. Madagascar is home to one of three Indian Ocean information fusion centers designed to collect data and coordinate MDA across the region.

Even as nations use technology and collaborative agreements to improve their MDA, they face important challenges going forward. Chief among those is the future of YARIS, which relies on funding from the European Union.

According to Megwa, YARIS's future may require a combination of public and private funding to ensure the system remains sustainable. That includes finding an African location to host the system's data center, which is in Portugal.

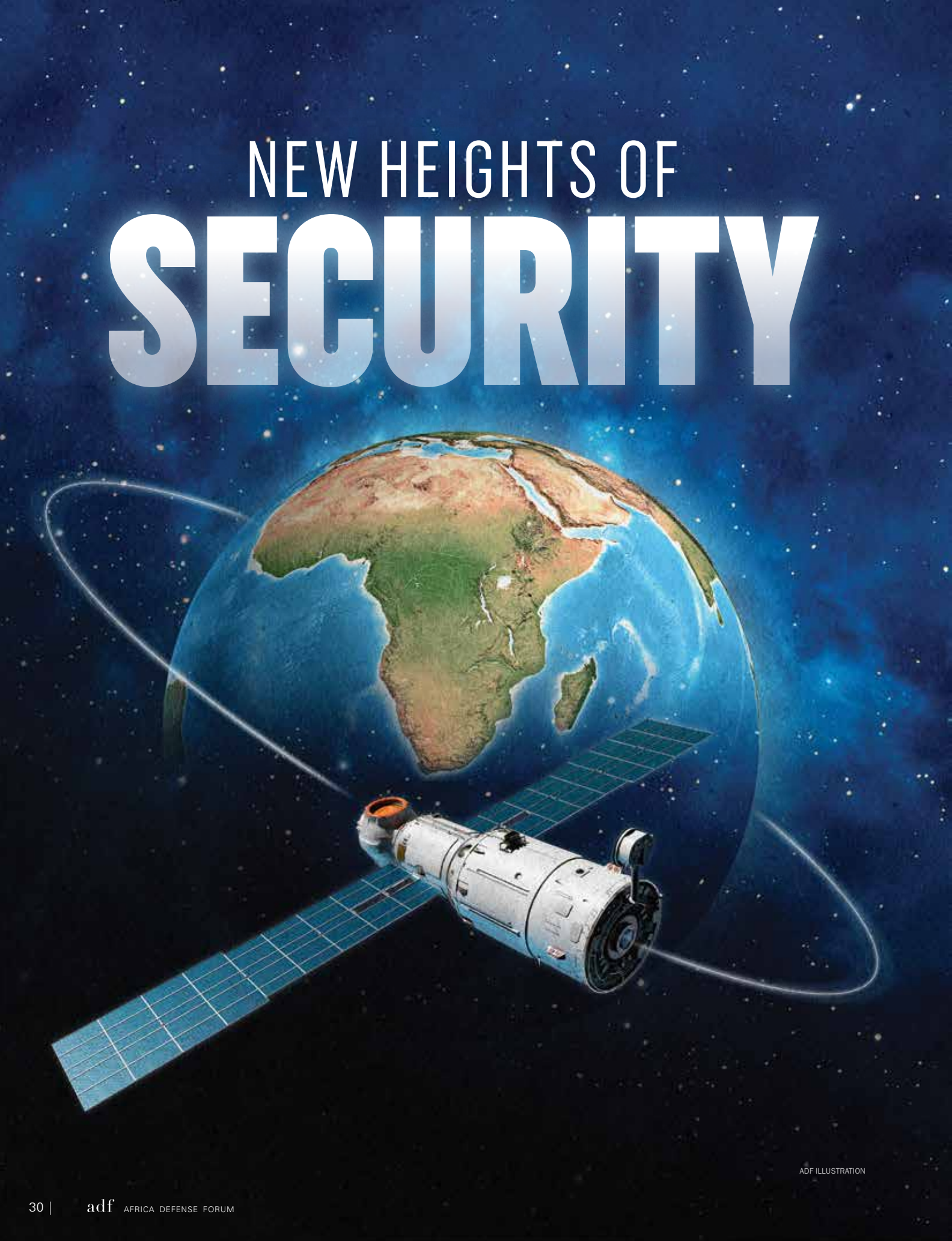
"There is no point in handing the system over to the region then having YARIS fail because there are other priorities," Megwa said. "It will be very much a collaborative effort."

The region also has a lack of trained people to take the reins of YARIS, which already struggles to get member nations to fully staff its information centers, according to researchers.

To avoid potential backsliding on marine security, Okafor-Yarwood and others say that African nations must put more attention and resources into guarding their coastal zones.

"Security technologies that focus on threat identification are only effective if law enforcement officials have the necessary resources to interdict these threats," Okafor-Yarwood and coauthors wrote. "The role of technology in MDA and maritime security capacity is crucial and undeniable." ❑

NEW HEIGHTS OF SECURITY



ADF ILLUSTRATION

SPACE TECHNOLOGY OFFERS A CLEAR VIEW OF A RANGE OF THREATS, SUCH AS DISASTERS, FAMINE, PIRACY AND VIOLENT EXTREMISM

ADF STAFF

Across the continent, military forces stalk insurgents and violent extremists, peering through range finders and binoculars, rifle scopes and night vision goggles. In some battle spaces, drones search from the sky for targets.

The tactics work to an extent, but Soldiers face constant threats when they don't have a clear view of the battlefield. Drones can be heard, then seen, then shot down or avoided.

One type of technology, however, takes operators way above the fray, collecting views of everything from severe weather to infrastructure needs and troop movements. Countries across Africa are leaning into satellite and space technology to track people, spot maritime threats, survey the effects of natural disasters and more.

> "THE APPLICATIONS AND PROBLEM-SOLVING INNOVATIONS PROVIDED BY SPACE PRODUCTS AND SERVICES ARE ENDLESS."
>
> ~ Val Munsami, chancellor of the International Space University in France

"Remote sensing applications provide a myriad of products and services, including monitoring the state of our natural resources, observing ship traffic in our coastal economic zones and providing information for precision farming that can help a farmer decide, for example, when to irrigate and how much fertilizer to use," Val Munsami, chancellor of the International Space University in France, wrote for Chatham House in 2022.

Satellite technology can see changes that portend waterborne diseases, improve maritime and aviation navigation, and provide positioning data for medical, postal, urban planning, infrastructure and other critical public services, wrote Munsami, who is the former CEO of the South African National Space Agency (SANSA).

"The applications and problem-solving innovations provided by space products and services are endless."

African nations have begun to invest more resources in the promise of space technology as a security and development asset. At least 21 nations scattered across the continent have established a space-related agency or organization. Some have launched their own satellites and are building multinational relationships through conferences and agreements.

SATELLITES BRING PERSPECTIVE

Kenya has been especially active in advancing its space program. In April 2023, the Kenya Space Agency (KSA) launched Taifa-1, its first earth observation satellite, aboard a SpaceX rocket in California. The small satellite's mission is to collect agricultural and environmental data, including on floods, drought and wildfires, to aid disaster management and address food insecurity, Reuters reported.

"We have the challenges that have been brought about by climate change, which the satellite, by virtue of being able to capture images (will be able to help monitor)," Alloyce Were, an aeronautical engineer and deputy director of Navigation and Positioning at the KSA, told Reuters before the launch. "We can monitor forest changes; we can monitor urbanization changes."

At $372,000 to build, Taifa-1 offers enviable value for its cost, which is just more than a third of the average unit price of one M1117 Guardian armored security vehicle.

In June 2024, the country held its second Kenya Space Expo & Conference in Nairobi themed "Space Technologies for Societal Benefits." The expo included representatives from government, academia, business, international groups and the public in a "dialogue on the use of space technologies in addressing societal needs," according to an event concept note.

The International Space Station is on screen during a public viewing of the deployment of Kenya's first nanosatellite from the station in 2018. AFP/GETTY IMAGES

Kenya Space Agency engineers Aloyce Were, left, Deche Bungule and Andrew Nyawade hold a prototype for the Taifa-1 satellite, which they designed and developed. AFP/GETTY IMAGES

The objectives were to showcase the applications of space technology and how they can benefit society, exchange ideas, encourage collaboration, raise public awareness, and encourage innovation and promote investment in the space economy.

During the expo's opening ceremony, Aden Duale, Kenyan cabinet secretary for defense, listed a wide range of effects space technology can have on the country, such as improved food security, supply-chain management, supporting energy production and predicting natural disasters.

"Kenya cannot afford to be left behind in this favorable future outlook for the global space economy," Duale said. "That is why as a government, we are taking our national space program seriously."

African nations see space technology primarily as a development tool. That is the right approach, Nigerian Temidayo Oniosun, managing director of Space in Africa, a marketing and consulting provider based in Lagos, Nigeria, told Le Monde in 2023.

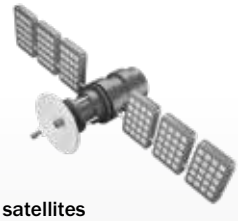
In 2021 and 2022, Angola, Ethiopia, Kenya, Mauritius and Uganda acquired new satellites, Le Monde reported, which brought the total number of African satellites to 55 in orbit at the time. It's not a significant number in terms of the tens of thousands circling the world, but most were launched in a five- to seven-year span, and many more were in development, Oniosun said.

SPACE AND SECURITY

Uganda launched its first satellite in November 2022. PearlAfricaSat-1 breached Earth's atmosphere aboard a Northrop Grumman Cygnus spacecraft launched from a United States NASA facility in Virginia. The craft also carried Zimbabwe's first satellite, ZimSat-1. Both went to the International Space Station, where they were eventually deployed.

Both satellites, created with cooperation from Japan, are to be used for earth observation. But Uganda has gone on record as eyeing outer space as a tool for national security.

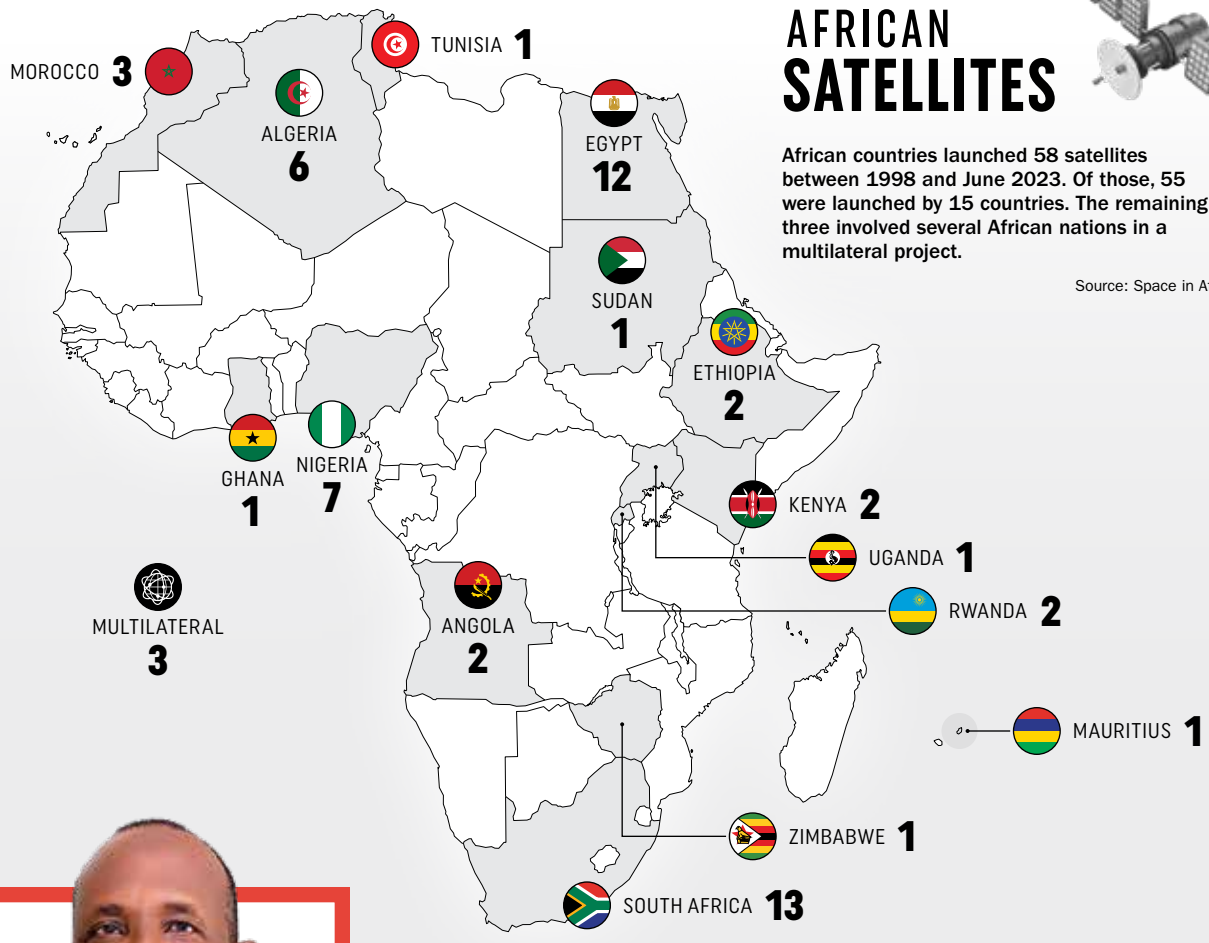
Less than a year after the deployment of



AFRICAN SATELLITES

African countries launched 58 satellites between 1998 and June 2023. Of those, 55 were launched by 15 countries. The remaining three involved several African nations in a multilateral project.

Source: Space in Africa



ADF ILLUSTRATION

"KENYA CANNOT AFFORD TO BE LEFT BEHIND IN THIS FAVORABLE FUTURE OUTLOOK FOR THE GLOBAL SPACE ECONOMY. THAT IS WHY AS A GOVERNMENT, WE ARE TAKING OUR NATIONAL SPACE PROGRAM SERIOUSLY."

~ Aden Bare Duale, Kenyan cabinet secretary for defense

PearlAfricaSat-1, Ugandan President Yoweri Museveni told graduating cadet officers in the Uganda Peoples' Defence Forces that the nation would launch a satellite to enhance security operations.

According to a September 2023 Space in Africa report, Museveni said "the Ugandan army is building its capacity to deal with all threats. The planned satellite launch, expected to act as eyes for the military, will reinforce our insights into security threats. In the early stages, we had only the infantry. However, we are now working towards launching a satellite."

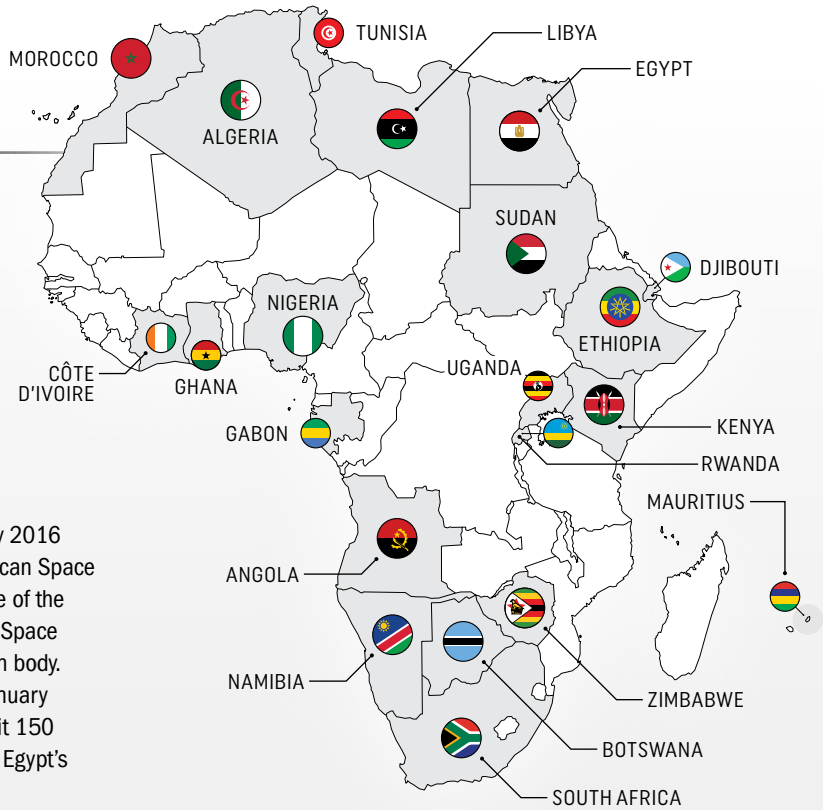
The satellite will monitor border areas, track potential threats and lead to more effective responses to security breaches.

Space has become an essential arena for modern military and intelligence operations, according to the website New Space Economy. Satellites can provide a range of security functions, such as:

- **Communications:** Satellites make secure, encrypted communication possible on land, at sea and in the air.
- **Navigation and geolocation:** Global positioning systems provide reliable navigational guidance in civilian and military applications.
- **Surveillance and reconnaissance:** High-resolution cameras and sensors can provide vital intelligence.

THE AFRICAN SPACE AGENCY

ADF STAFF



As African nations reach toward space, they have a continental organization to help oversee and coordinate their initiatives: the African Space Agency (AfSA).

The agency becomes operational at a crucial time for the industry. Business Insider Africa reported that the African Space Industry Annual Report says that 23 African countries intend to develop 125 new satellites by 2025. Africa's space industry, valued at $19.49 billion in 2021, is predicted to be $22.64 billion in 2026, a 16.16% increase.

The African Union entry into space policy began in January 2016 when the AU Heads of State and Government adopted the African Space Policy and Strategy. Two years later, the AU adopted the Statute of the African Space Agency, which established AfSA and the African Space Council, which is AfSA's 10-member oversight and coordination body.

The AU and Egyptian government inaugurated AfSA in January 2023, marking the official start of its operations. It will recruit 150 staff members in three phases and will be headquartered in Egypt's Space City in Cairo, home of the Egyptian Space Agency.

AfSA's objectives include harnessing the benefits of space science, developing a vibrant space market, maximizing benefits while avoiding duplication of resources and efforts, and promoting partnerships.

It also will support member states and regional economic communities as they build infrastructure, coordinate continental efforts, promote education and training, and work toward partnerships beyond Africa, among other things.

Tidiane Ouattara of Côte d'Ivoire, who became the first president of the African Space Council in 2024, sees Africa's nearly 60 orbiting satellites as practical technology that can enhance internet connectivity, monitor borders and improve agriculture. In short, Africa's space ambitions — a more than $400 million investment in 2024 — are a way to improve life on earth.

"We are not in space to explore the cosmos. We are not in space to go and seek what is happening on Mars and Jupiter," Ouattara told CNN in July 2024. "We want to improve our daily lives."

NATIONAL SPACE AGENCIES

Algeria Algiers	Algerian Space Agency • https://asal.dz/
Angola Luanda	National Space Program Management Office https://ggpen.gov.ao
Botswana Palapye	Botswana International University of Science, Technology (BIUST) • https://www.biust.ac.bw
Côte d'Ivoire Abidjan	The Côte d'Ivoire Geographic and Digital Information Center (CIGN)
Djibouti Djibouti City	Ministry of Higher Education and Research of Djibouti
Egypt Cairo	Egyptian Space Agency (EgSA) https://egsa-space-technology-portal.com/
Ethiopia Addis Ababa	Ethiopian Space Science and Technology Institute (ETSSTI) • https://etssti.org
Gabon Libreville	Gabonese Agency for Space Study and Observation (Agence Gabonaise d'Etude et d'Observation spatiales, AGEOS) • https://ageos.ga
Ghana Accra	Ghana Space Science and Technology Institute (GSSTI) https://gssti.org
Kenya Nairobi	Kenya Space Agency • https://ksa.go.ke
Libya Tripoli	Libyan Center for Remote Sensing and Space Science https://lcrsss.ly
Mauritius Ébène Cybercity	Mauritius Research and Innovation Council https://www.mric.mu
Morocco Rabat	The Royal Center for Remote Sensing (Centre Royal de Télédétection Spatiale, CRTS) https://www.crts.gov.ma/
Namibia Windhoek	Ministry of Higher Education, Technology and Innovation https://www.mheti.masimbi.com
Nigeria Abuja	National Space Research and Development Agency (NASRDA) • https://central.nasrda.gov.ng
Rwanda Kigali	Rwanda Space Agency • https://space.gov.rw
South Africa Pretoria	South African National Space Agency (SANSA) https://www.sansa.org.za
Sudan Khartoum	Institute of Space Research and Aerospace (ISRA) http://www.isra.sd
Tunisia Tunis	National Center of Mapping and Remote Sensing (Centre National de la Cartographie et de la Teledetection) • https://cnct.defense.tn/fr/
Uganda Kampala	Science, Technology and Innovation Secretariat https://sti.go.ug
Zimbabwe Harare	Zimbabwe National Geospatial and Space Agency https://zingsa.ac.zw

The South African National Space Agency operates the Space Weather Centre to forecast and warn of weather-related incidents.

SANSA

- **Early warning systems:** Satellites can detect missile launches, troop and ship movements, and other potential threats, providing more response time.

THE FUTURE

African countries are not content to simply launch satellites and collect data for themselves. Across the continent nations are showing a willingness and ability to engage with international partners in the spirit of advancing space technology globally and even supporting further crewed space exploration.

One of Africa's smallest countries, Mauritius, deployed its first satellite, MIR-SAT1, in 2021. In April 2024, Mauritius also held its first International Space Symposium, a two-day event aimed at "knowledge sharing, exploration, innovation, and unity," according to a government statement.

SANSA in 2022 renewed a lunar exploration partnership with NASA by breaking ground on a site for a new communications center that will support Artemis, which intends to return people to the moon and set the stage for further space exploration.

A new Lunar Exploration Ground Sites (LEGS) antenna is planned for Matjiesfontein, South Africa. The two countries also signed a joint statement of intent to formalize their space exploration partnership. The LEGS antenna will be the second of three 18- to 24-meter devices placed around the world "to ensure near-continuous connectivity between Earth and astronauts aboard NASA's Artemis spacecraft, as well as spacecraft in orbit around the Moon," NASA reported. It is expected to be completed in 2026.

People take selfies in front of a satellite antenna during a ceremony for the launch of the Ethiopian Remote Sensing Satellite at Entoto Observatory and Research Centre in Addis Ababa in 2019.

AFP/GETTY IMAGES

The Artemis program is NASA's ambitious mission to put the first woman and person of color on the moon, establish a long-term presence there, and use what is learned to send the first astronauts to Mars. And an African nation will take part in making it happen. ❑

The Finer Points of **Security Training**

ADF STAFF

A Somali National Army Soldier gently brushes away dirt during a course on how to detect improvised explosive devices at the General Dhagabadan Training Centre in Mogadishu in March 2024. More than 30 years of conflict have left Somalia with more than 1 million land mines and unexploded ordnance. At least 1,700 people have died from the blasts, and many more are permanently scarred or disabled. A majority of the victims are civilians. Somalia has worked with international partners to train experts in detecting and removing mines, ordnance and IEDs. Security personnel also are deploying dogs capable of sniffing out IEDs and other hazardous material.

AFP/GETTY IMAGES

ADF ILLUSTRATION

BUILDING BARRIERS TO DISINFORMATION

Security Forces Play a Key Role in a New Framework to Fight Online Lies and Distortions

ADF STAFF

Ghana is known for its history of strong civilian government, adherence to democratic principles, and international engagement regionally and around the world. It serves as an island of stability in West Africa, a region beset by military coups and violent extremism.

It is not, however, immune from some of the stressors faced by its neighbors, especially regarding disinformation. Malign influencers have used no fewer than 72 campaigns to obfuscate, twist and distort reality in West Africa, according to a March 2024 Africa Center for Strategic Studies (ACSS) report. Ghana is the victim of at least five of these efforts perpetrated by China, Russia, domestic political actors and others.

"With the advancement of media, now there's a multiplicity of channels all over the country, and we're very proud of that," Ghana's then-Minister for Information Kojo Oppong Nkrumah told Nigeria-based FactCheckHub in late 2023. "The risk, therefore, is that information that lacks integrity finds itself in the public domain, and that's what gives rise to mis/disinformation."

Harriet Ofori, who tracks disinformation as research and project manager at Penplusbytes, a Ghanaian not-for-profit, said her organization works with the media, academic institutions, UNESCO, the National Commission for Civic Education and others on a wide range of projects and initiatives. She recalls one particularly dangerous disinformation campaign.

"In July 2023, an audio message calling for attacks on the Ghanaian government over the forced repatriation of Fulani asylum-seekers spread via WhatsApp in northern Ghana," she told ADF via email. "The message falsely claimed the government was trying to exterminate the Fulani population and urged retaliation. This message was distributed by a media wing of Jama'at Nusrat al-Islam wal-Muslimin (JNIM)."

As disinformation increases at an almost exponential rate from violent extremist organizations, Russian lackies and Chinese interests, some African nations are intensifying their efforts to push the continent toward the truth. It's a herculean task that requires extraordinary detection mechanisms, early warning systems and strong collaboration between civil society groups, governments, the media and security forces.

Ghana and its neighbor, Côte d'Ivoire, stand out in this regard. Ghana in December 2023 conceived a draft National Action Plan to tackle disinformation. It came after a National Conference on Disinformation and Misinformation and is the work of political parties, civil society groups, the media and development partners, FactCheckHub reported. When approved, the action plan seeks to protect information integrity, push media literacy and cultivate responsible digital citizenship.

Penplusbytes also has collaborated with the Ghanaian government. It conducted disinformation research with support from the National Endowment for Democracy and then engaged officials, including the Ministry of Information, to share research findings and discuss recommendations for combating disinformation as the nation works on its action plan, Ofori said.

To Ghana's west, Côte d'Ivoire is making the public aware of disinformation's dangers. Amadou Coulibaly, minister of communication and digital economy, told residents of Abidjan's Adjamé community in July 2024

DEFINING TERMS

DISINFORMATION is false and manufactured to deliberately harm people, social groups, organizations or a country. An example is spreading a false rumor that security forces are supplying weapons to terrorists.

MISINFORMATION also is false, but it lacks a deliberate intent to cause harm. For example, community leaders might unwittingly spread a false claim they believe to be true.

MALINFORMATION, though based in reality, is used to cause harm. It could include leaked information that should have remained private. It also can include hate speech.

Source: "Information Disorder: Toward an interdisciplinary framework for research and policy making," 2017, by Claire Wardle, Ph.D., and Hossein Derakhshan

that when they share false information on social media, it makes them "digital wizards," according to the Ivoirian news website Koaci.com. His speech was part of the nation's #EnLigneTousResponsables (Online All Responsible) campaign.

A NEW TOOL EMERGES

As disinformation continues to grow, a new process aims to detect the threat and turn the tide against it in Africa's communications landscape. It's called the "fence framework," and it uses a familiar image to explain the interplay between information gathering, sharing and messaging.

The "challenge is to create surge protectors — what we can simply call 'fences' — to keep disinformation out and empower online users to protect themselves from manipulative interference," wrote Dr. Mark Duerksen, research associate with the ACSS; Vanessa Manessong, an investigative data analyst at Code for Africa in Cameroon; and Ofori. The three published their paper, "The fence framework," on the website Africa in Fact in July 2024.

The fence motif, which depicts posts, slats and signs, illustrates how to address disinformation in a coordinated way. When the three elements work together, responders can identify, classify and respond to disinformation efficiently.

POSTS: THE DATA

In the fence illustration, the posts form the foundation of the response. They represent the data responders have about disinformation. The ABCDE framework asks a series of crucial questions at this stage: What **actors** are involved? What **behavior** is exhibited? What kind of **content** is being distributed? What is the degree of the **distribution**, and what audiences are targeted? What is the overall **effect** of the disinformation?

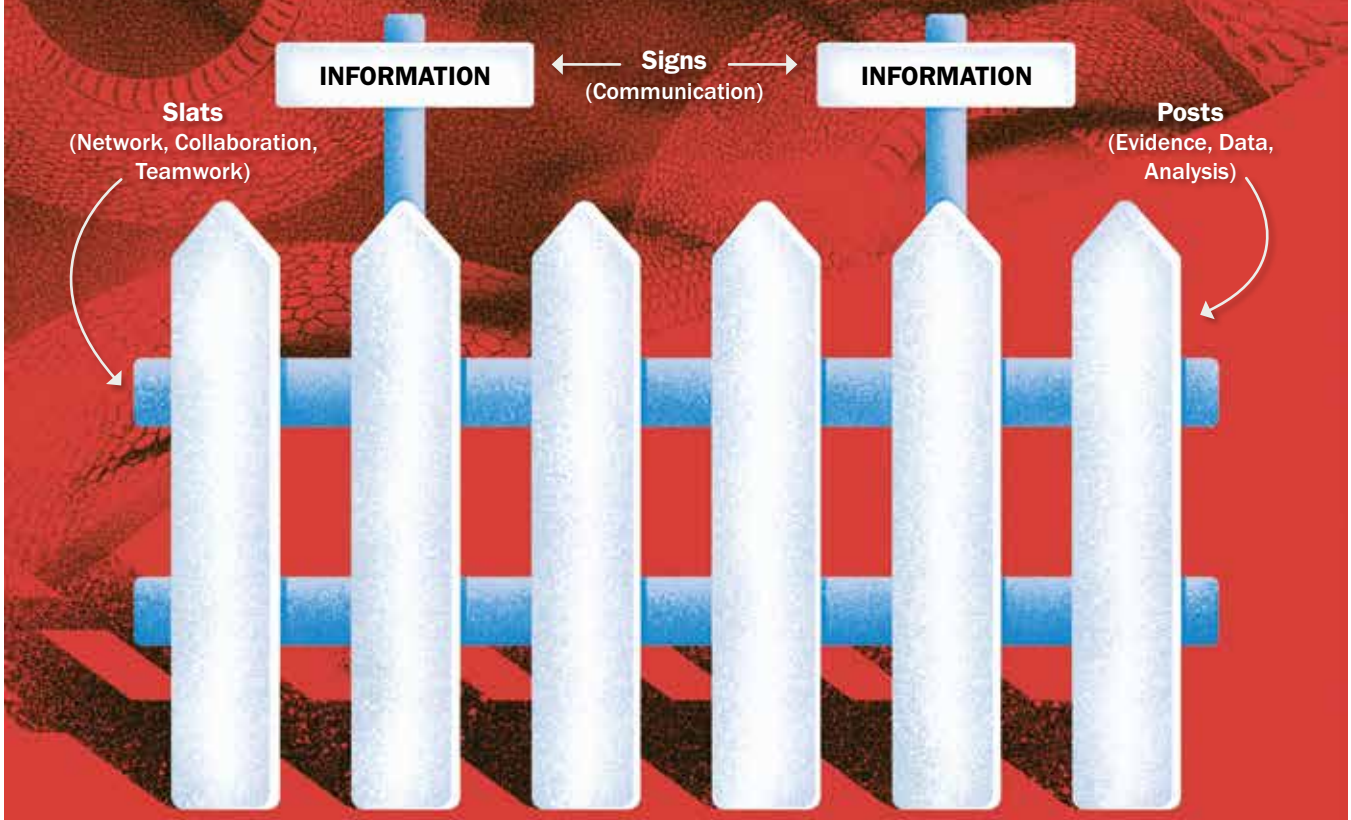
Academics, journalists, fact checkers, nongovernmental organizations, various civil society groups and security forces can collect this type of data. The collection offers insights about which campaigns are going viral or doing the most immediate damage in the information environment. What particular narratives are being spread? Are perpetrators using simple cut-and-paste techniques on social media, or more sophisticated techniques? All of this information comes together to form a picture that is useful in the second element of the framework.

SLATS: COOPERATION

Slats connect the posts and hold them together. The slats represent the cooperation that helps people share and

In the fence framework, posts depict evidence, data and analysis. Slats represent networks, collaboration and teamwork. Signs communicate information about disinformation campaigns.

It's called the "fence framework," and it uses a familiar image to explain the interplay between information gathering, sharing and messaging.



Source: "The fence framework," by Mark Duerksen, Vanessa Manessong and Harriet Ofori; published by Africa in Fact

ADF ILLUSTRATION

make sense of the data they gathered about the disinformation being spread.

"Research on disinformation campaigns must be exchangeable and interpretable by practitioners to have an impact," the article states. Doing so relies on established standards, shared terminology, networks and collaboration so information can be reliably shared among the people and agencies who need to see it.

Shared terminology, understanding and approaches will let an NGO in one country communicate with a media fact-checking organization in another about threats it is seeing. The hope is that through this process, a bigger picture will emerge about the nature of the disinformation campaign and who is spreading it. Because disinformation transcends national borders, this type of collaboration is essential.

One useful collaboration tool is an information sharing and analysis center (ISAC). The vision is to have a network of ISACs set up across the continent to serve as hubs for analyzing and countering disinformation. As of mid-2024, there were no ISACs in Africa, but Debunk.org, an independent Lithuanian anti-disinformation think tank, has funding to set up an ISAC in Kinshasa, Democratic Republic of the Congo.

SIGNS: RESPONSE

Once data is collected, organized, analyzed and shared, an appropriate response can begin. This is the signs component of the fence framework. The data and relationships have to work "toward an end, whether that's doing an awareness-building campaign where you're just trying to get the word out about what's happening, whether it's lobbying some of the social media platforms, telling them what's happening, trying to work with them to take down certain content or to block or take down some of these bot networks," Duerksen told ADF.

This is the stage at which officials warn the public about active disinformation campaigns. This can include countering bad information with good messaging or telling information platforms that hostile forces are using them to spread disinformation. This kind of communication and capacity building also can come before disinformation is released.

"Your response is trying to build digital literacy in society, kind of helping people understand that these attacks are coming," Duerksen said. Doing so in advance of an attack sometimes can preempt disinformation.

THE ROLE OF SECURITY FORCES

When fighting disinformation, cooperation among a range of agencies and interests is essential. Militaries have a part to play. Disinformation is a legitimate concern in the security arena because it constitutes a form of hybrid warfare and can pose a real, tangible threat to Soldiers, including peacekeepers, who operate in areas teeming with toxic messaging. Such was the case with the United Nations peacekeeping mission in the DRC.

A Ghanaian man reads a newspaper in Accra. Disinformation campaigns have targeted the stable West African nation. AFP/GETTY IMAGES

THE DANGERS OF DEEPFAKES

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As artificial intelligence (AI) technology continues to grow, African officials will have to be on the lookout for a particularly insidious disinformation tool: deepfakes.

Deepfakes are a form of digital media created by AI tools that can be used to manipulate photos, audio and video. This can be dangerous because they can be used to create media that purports to show a political or well-known figure saying or doing something they wouldn't normally say or do.

Disinformation attacks that incorporate deepfakes pose another problem in that certain free, downloadable software applications can make them easy enough for almost anyone to create.

The implications for use by terrorists and violent extremist organizations are dire.

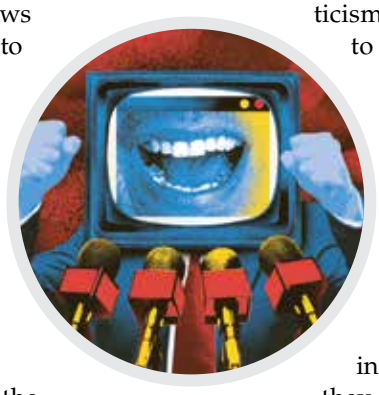
"A future scenario might involve automated bots spreading deepfake videos that incite protests or violence, rapidly disseminating across multiple platforms, each tailored to resonate with specific subgroups," according to Lidia Bernd's 2024 article, "AI-Enabled Deception: The New Arena of Counterterrorism," for Georgetown Security Studies Review.

Governments, tech companies and academic institutions will have to work together to develop and continuously update AI-driven tools to detect deepfakes, Bernd wrote.

South African researcher Layckan Van Gensen, junior lecturer in mercantile law at Stellenbosch University, promotes laws to protect image rights as a way to combat deepfakes. Image rights legislation, she wrote for the Daily Nation newspaper, would clearly define a person's image, specify when that image has been infringed and provide the image holder legal remedies for unauthorized use.

In that mission, disinformation and misinformation were a constant threat, and one that prompted leaders to build what they called a "digital army" to fight the problem. Through the strategy, the mission empowered civilians, particularly young ones, to detect malign news and social media posts and respond with accurate information.

Bintou Keita, United Nations special representative for the DRC and head of the U.N. peacekeeping mission there, said in a 2023 interview with UN News that armed groups deliberately spread lies to incite people to oppose the mission.



"Just to give you one example, while the high level segment of the General Assembly was going on, I was in Kinshasa when somebody decided to create fake news which was a photo of me from I think three years ago, when I was the assistant secretary-general for Africa [at the U.N. headquarters], in New York and had the text which was saying basically that I, as the head of [the mission], was resisting the departure of the mission," Kieta told UN News. "This is untrue because, first of all, I was not here at the General Assembly. I was in Kinshasa.

"We had a discussion on what do we do, do we say that this is fake? What do we do at the end? I think the colleagues decided, OK, it is fake, and it went."

Military and security forces often have more assets and technical expertise than their civilian partners, but they must take care when operating in the public information environment. In fact, there are good reasons why the military should not lead these efforts at all.

Sometimes, citizens don't trust their nations' military forces. If those forces then start telling people what information is good and what isn't, it can breed skepticism. That will undermine genuine attempts to combat disinformation.

That's why journalists, fact checkers and researchers might make better front-line messengers for civilian populations, especially if they are trusted sources such as local radio broadcasters or reporters.

Still, Duerksen said, military forces need to be aware and keep their "finger on the pulse" of the information environment where they are serving by monitoring local radio and social media. This way they can track false narratives and report back to local journalists and influencers. What they should not do is be perceived to be lobbying public platforms or putting out information themselves.

"So, when you see this stuff, who do you go to?" Duerksen said. "Who do you take it to? Who is the best mouthpiece for it? Who is in the best place to respond? And that's most likely not the military." ❑

ADF ILLUSTRATION

A SIMULATED BATTLEFIELD

ARMED FORCES ARE USING TECHNOLOGY AND REALISTIC SCENARIOS TO TRAIN TROOPS

ADF STAFF

MODERN COMBAT TRAINING goes something like this: On the battlefield, Soldiers are briefed on the mission's objective. They carry real weapons, often loaded with blank ammo. Coded laser devices attached to gun barrels "fire" when the trigger is pulled. Soldiers wear sensors on their helmets and vests that detect when a laser from the fired weapon hits them. They also carry simulated anti-tank weapons and laser hand grenades.

"In the case of weapons with electronic sights, such as tanks and anti-tank weapons, virtual elements can already be incorporated as part of training," Saab, the Swedish aerospace and defense company, reports in one scenario. "A computer can be used to generate obstacles and opponents that are uploaded into the sight and to which the user must respond."

Gyroscopes and a computer system manage the simulation, tracking participants' movements, recording hits and controlling scenario progression. They also factor in variables such as travel distance and gravity to determine whether each shot would have hit its target under real conditions.

In some cases, high-definition projectors display virtual environments and targets on screens or walls. Instructors use a control system to define the training scenario, including terrain, objectives and enemy positions. The system instantly registers hits, providing immediate feedback to participants and instructors.

Laser-based battlefield simulations can handle basic and advanced firearms training from small arms up to crew-served weapon systems. They can be configured to support individual marksmanship training and complex tactical scenarios involving hundreds of Soldiers. As the technology advances, simulation systems are likely to become even more realistic and effective. As the cost of simulation military training continues to come down, it's inevitable that more African armed forces will adopt some of the technology.

Simulation military training has been on the continent for years, with South Africa and Uganda being early adopters of laser technology. In 2021, Kenya signed a contract with Saab to buy a laser-based system. Saab contracted to provide new training equipment, such as personnel detection devices, vehicle training systems, laser grenades and training applications for a variety of weapons. The equipment includes exercise control and communication systems, and training courses for users and maintenance personnel, Military Africa reported. The equipment comes with about 800 kits for equipping Soldiers.

British and Kenyan Soldiers study tactical positions during a military exercise simulation. AFP/GETTY IMAGES

ANCIENT SIMULATION TECH

When people discuss simulation training, they talk about flight simulators, computer war games, sophisticated shooting galleries and virtual reality (VR) devices. But simulation training dates to 5,000 years ago, when military leaders started using colored stones and grid systems on a board to map out strategies. Later simulations included designating some Soldiers as "enemies," to be attacked and captured using strategies developed beforehand. Such simulations using designated opponents endure to this day, in the form of vast military exercises involving multiple nations.

The advantages of simulation exercises are clear. Training time is reduced. Soldiers can field-test new equipment and tactics. Militaries can work in joint operations, ironing out problems before taking to the field. Simulations preserve the environment and enhance safety. Costs are greatly reduced, and perhaps most important, training objectives can be accurately measured.

Simulations can be broken into three broad categories:

Constructive simulations, also known as tabletop simulations, are purely hypothetical, allowing countless "what if" scenarios. Military leaders centuries ago were engaged in constructive simulation with their markers and maps.

In constructive simulations, everything is imaginary — people, equipment and terrain. Modern constructive simulations are used for pure wargaming, using computer modeling to move imaginary Soldiers through various field scenarios, such as combat. Modern constructive simulations have become incredibly sophisticated, with computers fed such data as troop types and numbers, weather, locations of enemy troops, strength and types of armaments, and field conditions. Invasions, rescue operations and other field maneuvers are then "played" repeatedly to see which approaches give the best results.

Live simulations consist of real people, real or dummy weapons, and blank ammunition. A typical scenario will have Soldiers in the field wearing sensors on their shoulders or helmets so their exact locations can be monitored. This type of simulation provides a learning environment as close to reality as possible. Live simulations have obvious advantages, including getting Soldiers in the field accustomed to wearing and traveling with their gear. It is an excellent way for Soldiers to provide feedback to their trainers. Soldiers trained with live simulations tend to retain their training longer than with other types of simulations.

Virtual simulations involve real people being placed in simulated environments. Flight trainers, which date back to World War II, are early virtual simulators.

A Soldier trains in an urban environment using laser simulation equipment. COPYRIGHT SAAB AB

Togolese police officers disguised as terrorists carried out a simulated attack in the capital of Lomé. AFP/GETTY IMAGES

Virtual simulation can use off-the-shelf components that also have industrial and civilian uses.

Virtual simulation is accepted, and even welcomed, by young Soldiers who grew up playing video games. It is highly adaptable. Armies use virtual simulation for training individuals and teams. An entire crew can be trained at the same time in one facility. Virtual simulation provides the best possible scenario for instructors to give students instant feedback.

LOWER COSTS

Traditional military training methods such as live exercises are expensive. Such training involves logistical expenses, such as fuel, ammunition and equipment maintenance. Just the wear and tear on a physical training area can be severe. Poland-based VR software company 4Experience says that the cost of preparing Soldiers for their first live operational assignment can cost about $36,000 per person. Live training exercises also require building physical settings and hiring expert instructors, further driving up costs, the software company said.

Because of the cost of traditional training, simulation training is becoming a necessity. One South African official told ADF that 30 simulated military exercises can be funded for the same price as one traditional brigade exercise. Simulations can be used in a wide range of applications, such as first-aid, combat, parachuting and flight training. Simulations even can be used for classroom instruction.

Flight simulators, ranging from desktop computers with multiple screens all the way up to full-sized cabins capable of training an entire crew at the same time, have become common in Africa's air forces.

Aside from actual flight training, cabin-type simulators provide the best, most realistic way to train pilots and crews. But less-expensive VR flight simulations are continuing to improve.

When VR is mentioned, most people think of a headset that resembles a bulky pair of goggles. VR headsets for training can include accessories such as controllers, additional sensors and gloves. At the extreme end, trainees wearing simulation goggles are strapped into a large moving frame that simulates parachute training. These devices are connected to a computer, and when the entire system is working properly, users can see and interact with simulated objects and environments in 3D.

Although the cost of VR compares favorably with other types of simulation warfare equipment, the initial costs can be daunting. Cyprus-based software company Program Ace says that developing a VR training application typically costs between $50,000 and $1 million, depending on the project's scope and

ADOPTION OF SIMULATION TECHNOLOGY WILL HELP AFRICAN NATIONS BRIDGE TECHNOLOGICAL GAPS BETWEEN THEIR MILITARIES AND THOSE OF COUNTERPARTS ELSEWHERE.

complexity. VR headsets range from $400 to $700 each. Despite the initial investment, VR training can quickly become less expensive when the costs are spread over many training sessions, according to California-based VR company Strivr. The reduction comes from the reusability and scalability of VR training equipment, which doesn't require the same repetitive expenses as traditional methods.

There remains a serious downside to some VR applications — side effects from its use. They can include dizziness, nausea, eyestrain, vomiting, headaches, sweating and disorientation, according to The Economist and other sources. In one study, more than 60% of users were affected.

Hans Lindgren, head of Business Development for Business Unit Training & Simulation at Saab, said VR training session times have to be limited.

"You take those goggles, for instance," he told ADF. "There are certain situations where those can be used, but the feedback from customers is that you get illness pretty quick when you put those on. You cannot train for a long time. And especially in some kinds of team training, there is still a need for movement with your feet and your body, which it doesn't allow in most applications."

SIMULATION TRAINING FOR AFRICA

Many African nations are involved in simulation training:

- South Africa pioneered simulation training in Africa in 1997, when it converted a military dining facility to the South African Centre for Conflict Simulation. At its peak, it conducted 25 to 35 simulations each year. South Africa since has acquired a land-based submarine combat team trainer for its Navy, along with several submarine periscope simulators, a concept helicopter flight deck simulator and concept bridge simulator, according to defenceWeb.
- In Nigeria, the Army has used simulation training programs to prepare Soldiers to fight the extremist group Boko Haram.
- The Kenya Navy now uses VR technology for maritime security training. The Full Mission Bridge Simulator at Kenya Naval Training College offers training that complies with international maritime standards. Kenya also has acquired training and simulation systems from Saab, including vehicle training systems, training applications for various weapons, and training courses for maintenance and operation.
- The Rwanda Military Hospital opened its Medical Modeling and Simulation Center in 2017, where military personnel, particularly doctors and nurses, train to handle wounded Soldiers in the field.
- The Tunisian Air Force, one of the continent's smaller air forces with 4,500 personnel, has invested in simulation pilot training and air traffic control training. South Africa and Algeria were among the continent's earliest adopters of flight simulators. A decade ago, South Africa had 11, and Algeria had 10, Military Simulation & Training magazine reported.
- The Côte d'Ivoire Air Force acquired a flight simulator in 2022 through a project management and technical assistance company. The simulator allows the country to be more self-sufficient with its military training. Côte d'Ivoire also signed a contract with a French company that supplied and installed a combat simulator system for the defense ministry.

The cockpit of this flight simulator looks like a real plane. ALSIM

There are challenges for some African countries that are adopting simulation training techniques. Many countries have a limited technical infrastructure. The initial price of investing in simulation equipment can be high. And there is a persistent shortage of skilled personnel to maintain and operate simulation training equipment. As one Kenyan officer told ADF, military personnel in Africa who receive extensive technical training are difficult to retain after their enlistments are up, because well-paying civilian jobs await them.

But most experts think that investment in simulation training is necessary and inevitable, even for armed forces on tight budgets. African countries will have to keep up with modern technology to maintain a competitive edge in all fields, and that includes their armed forces. Adoption of simulation technology will help African nations bridge technological gaps between their militaries and those of counterparts elsewhere. Simulation training has been shown to improve overall combat readiness and effectiveness, at significant cost savings over the long term. ❑

A dummy and a destroyed car are part of accident simulation training in Senegal. AFP/GETTY IMAGES

A REGION GRIPPED BY COUPS

ADF ILLUSTRATION

A LOOK AT THE CAUSES, CONSEQUENCES AND RESPONSES TO THE RISE OF MILITARY RULE IN WEST AFRICA

CMDR. OWONAM EQUERE, NIGERIAN NAVY

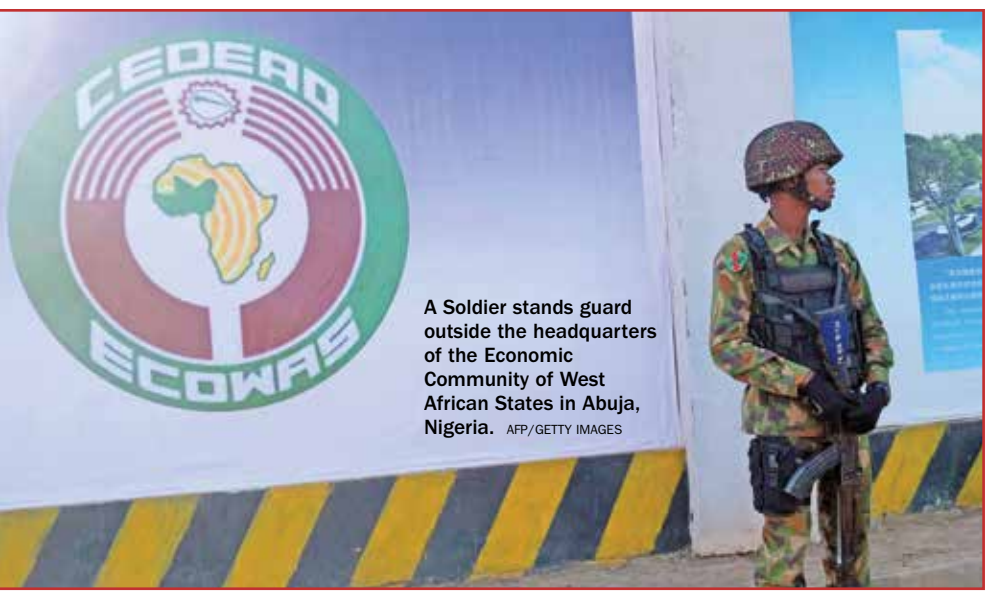
Nigerian Navy Cmdr. Owonam Equere

Africa has witnessed a troubling surge in coups d'état, reminiscent of the early post-colonial decades when they were common. From 2020 to 2023, there were nine successful military coups in Africa, with six taking place in West Africa: two in Mali (August 2020 and May 2021), one in Guinea (September 2021), two in Burkina Faso (January 2022 and September 2022), and one in Niger (July 2023). Within the period, reports of attempted coups in The Gambia, Guinea-Bissau, Mali, Niger and Sierra Leone show the potential for further political instability.

West Africa faces multiple security challenges such as terrorism, violent extremism, intercommunal violence and banditry. There is evidence that the spate of coups is worsening the region's fragility. Burkina Faso saw a doubling in fatalities from extremist violence in the year after its coups. Niger saw a 60% rise in fatalities from extremist violence in the year after the coup. Mali experienced a 70% surge in terror attacks in the year after the 2021 coup.

Key Drivers of West African Coups

Several factors played a role in this coup resurgence. First is the geopolitical climate. Many of the recent coups took place in former French colonies, allowing coup leaders to take advantage of anti-French sentiment and present themselves as heroes fighting colonialism. Related to this is the geopolitical rivalry in the Sahel of the West, Russia and China for resources and influence. The juntas in Burkina Faso, Mali and Niger received tacit or explicit support from Russia that bolstered legitimacy of their regimes, undermined the anti-coup responses and emboldened other military plotters in the region seeking to disrupt constitutional democracy. Most of the nations under military rule have moved into Russia's orbit of influence and welcomed Russian mercenaries to operate on their territory.



A Soldier stands guard outside the headquarters of the Economic Community of West African States in Abuja, Nigeria. AFP/GETTY IMAGES

Another factor is the lack of good governance by elected political leaders in coup-affected countries. The failure of many African leaders to honor social contracts with their citizens and use democratic power for public good creates the conditions for popular support of military coups. Pervasive corruption, extreme poverty, widespread unemployment and insecurity characterize the four countries recently affected by military coups. It's little wonder that most of these coup leaders were welcomed by citizens who were desperately looking for a leadership alternative. It further highlights the crisis in the state-society relationship.

Coups in the region have been enabled by the crisis in civil-military relations and a politicization of the security sector. Some leaders use the military for regime protection or "coup proofing." This strategy includes the creation of presidential guards with enormous power and authority beyond the military institution. In most cases, these guards are established outside the recognized military chain of command without accountability and transparency. They are packed with soldiers believed to be loyal to the regime. The result is the erosion of the core military values of professionalism, loyalty to the constitution and organizational discipline. It is thus unsurprising that most coups in the region have been led by elements of the presidential guard, while the military as an institution remained aloof.

Similarly, the perceived inability of the government to guarantee the security of its citizens creates favorable conditions for coups. The dynamism of the security environment has exposed the huge gap between the capacity of national security institutions and the increasing activities of terrorist groups. According to the Global Terrorism Index, the Sahel now accounts for 43% of global terrorism deaths. Ineffective civilian leadership, coupled with the limited capacity of security forces to discharge their responsibilities, increases public pressure on the military and provides justification for coups.

A Region in Peril

The nexus of instability in the Sahel is the tri-border area shared by Burkina Faso, Mali and Niger. This is the epicenter of a fast-growing crisis with unprecedented levels of armed violence and insecurity. More than 12.8 million people need humanitarian assistance across these countries. Millions have been displaced, and there are widespread disruptions to schools, health care and agriculture. All three countries are ruled by military juntas.

Coup leaders often cite this insecurity to justify their actions, but coups have tended to worsen the problems instead of addressing them.

Diminished state capacity: The first obvious impact of coups d'état is the weakening of national political leadership and state capacity. Coups often result in fractured and weak political leadership that might not prioritize cooperation on regional security. Military leaders often lack the international credibility, political will and experience needed to address security challenges. For instance, before the coup in Niger, the democratically elected President Mohamed Bazoum played a significant role in rallying international support in the regional fight against terrorism and irregular migration. He also attracted funding for developmental initiatives in the Sahel. However, since his overthrow in 2023, the junta's priority has been to consolidate power and protect itself. Similarly, in Burkina Faso and Mali, the political transition challenges have distracted from efforts to fight regional insurgencies. In the same vein, the international sanctions imposed after coups weaken state capacity to

Two girls walk near a refugee resettlement camp in southern Niger. Violence in the Sahel has displaced millions and created the environment for military officers to seize power. AFP/GETTY IMAGES

Protesters in Burkina Faso hold signs denouncing the Economic Community of West African States. Recent coups in the region have caused a crisis of legitimacy for the West African bloc. AFP/GETTY IMAGES

respond to insecurity. For instance, in Burkina Faso, Mali and Niger, there was a cessation of defense and security assistance by Western allies, which was exacerbated by the diplomatic, trade and financial sanctions of the Economic Community of West African States (ECOWAS). This international isolation not only affects states' ability to contribute to regional security efforts but also lessens their capacity to address humanitarian needs. The resulting vacuum lets terrorists ingratiate themselves to local populations by providing basic services and goods and promising to provide the protection that the central government failed to deliver.

Broken security partnerships: Coups also are derailing security partnerships. In recent years, the challenges posed by terrorism and insurgency in the Sahel have spurred several security cooperation initiatives, including the Multinational Joint Task Force, the French-led Operation Barkhane, the European Union-led Takuba mission, the G5 Sahel Joint Force and the U.N. peacekeeping mission in Mali. Coups have undermined nearly all of these cooperative arrangements. Since taking power in Mali in August 2020, the military junta has taken steps to alienate its regional and international security partners. These include detaining Ivoirian Soldiers sent to support the U.N. mission, expelling senior U.N. officials and unilaterally withdrawing from the G5 Sahel. This reduced Mali's security coordination with its neighbors and exposed its border areas to attacks. The juntas in Burkina Faso and Niger also alienated traditional security partners, which led to decreased military pressure against the terrorist groups.

As Western allies scaled down their support for Burkina Faso, Mali and Niger in response to the coups, a gap was left in the regional security architecture. The consequence is that insurgent groups can consolidate political control, enforce conservative ideology in occupied territories and complicate state efforts to reestablish control of these areas. These juntas have sought alternative partners, especially Russia's Wagner Group mercenaries. The introduction of the Wagner Group into the

regional security complex raises concerns given its history of human rights abuses and efforts to extract profit in conflict zones.

Harm to cross-border trade: Coups are disrupting cross-border developmental initiatives in the Sahel. Some key developmental projects include the Trans-Saharan Highway, Trans-Saharan Gas Pipeline and the Nigerian-Morocco Gas Pipeline. These projects are essential to regional connectivity and integration, which lowers the potential for conflicts over resources, enhances regional resilience to security threats and contributes to long-term stability. Coups not only limit the ability of international partners to work with affected countries; they also undermine cross-border security arrangements such as surveillance systems and joint development of infrastructure at border crossings. They also limit the implementation of joint border control mechanisms to check the movement of illicit goods, weapons and individuals involved in crime or terrorism. Terrorists and transnational criminals can exploit gaps created by weakened cross-border security arrangements.

Weakened regional blocs: The proliferation of coups in West Africa has the potential to weaken ECOWAS. The inability of ECOWAS to stop or reverse coups through sanctions or military intervention could lead to a loss of confidence in the regional bloc. Juntas in Burkina Faso, Guinea, Mali and Niger have been emboldened and formed an alliance to dilute the effectiveness of ECOWAS sanctions such as border closures. The three Sahel countries upped the ante by further announcing their withdrawal from the regional bloc and the formation of the Alliance of Sahel States, complicating ECOWAS engagements with their respective transitional military leaders. This division and rift within ECOWAS could weaken its influence and anti-coup stance, increasing the possibility of future coups. A weakened ECOWAS has implications for its role in conflict prevention, mediation and peacekeeping. Similarly, regional security initiatives in combating terrorism, organized crime and cross-border security threats could be compromised.

The Way Forward

The current situation in Guinea, Mali, Burkina Faso and Niger has affected the states' capacity to contribute to the regional fight against terrorism, derailed regional cooperative efforts, disrupted cross-border development initiatives and potentially risks weakening ECOWAS. Against this backdrop, the African Union, ECOWAS and the international community need a more nuanced approach. The sanction regime on the juntas is not having the desired deterrent effect, but rather isolates these countries that are crucial to the regional security architecture. Accordingly, the AU and ECOWAS need to intensify diplomatic engagements with the transitional military leaders for a swift return to constitutional order. When constitutional order is restored, the AU and ECOWAS need to push for comprehensive security sector reform in these countries to ensure that the militaries are professional, adequately funded and able to respond to the security challenges they face.

The head of Niger's military junta, Gen. Abdourahamane Tiani, left, welcomes the head of Mali's junta, Col. Assimi Goïta, as he arrives in Niamey. AFP/GETTY IMAGES

Also, it is imperative for the AU to work closely with ECOWAS to lead the fight against terrorism and violent extremism in the Sahel, reducing the overreliance on international partners and the risks associated with their premature pullouts. Given the weaknesses of the affected countries and the potential of a spillover of violence, coastal countries such as Benin, Côte d'Ivoire, Ghana and Togo need to carry out regular risk analyses to elevate their state of readiness to respond to threats from the Sahel, and the resulting humanitarian crises. To discourage further coups the AU and ECOWAS should strictly and impartially enforce democratic and governance norms as enshrined in the various normative frameworks. The AU and ECOWAS must take swift and decisive action against leaders who violate the principles of democratic governance. ❑

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A Polish M-346

Nigeria Adds

Combat Aircraft to Fleet

DEFENCEWEB

The Nigerian Air Force was expected to take delivery of its first M-346 combat planes by the end of 2024 from Italy's Leonardo.

The air force is acquiring 24 M-346 fighter aircraft, a significant step in its "ongoing efforts to modernize its fleet as well as bolster its operation effectiveness," it said. The jets are expected to be delivered in four groups of six each. The deal was announced in 2022.

A Leonardo official said details on pilot and technician training still needed to be worked out. There is a 25-year binding agreement for Leonardo to support maintenance. Nigerian Air Force staff members said the M-346s will be used for training, close air support, air interdiction and tactical reconnaissance.

The Aermacchi M-346 Master is a family of military twin-engine advanced jet trainers and light combat aircraft. Italy, Israel, Poland and Singapore are among the countries that use the planes. The M-346 is powered by two Honeywell F124 turbofan engines. In addition to training, the M-346 can be used for combat missions such as close air support and air policing duties.

In 2023, the Nigerian Air Force said it had been effectively using new assets in combat, which were instrumental in defeating terrorists and insurgents. Battlefield successes against Boko Haram and other terrorist groups were attributed to the newly acquired JF-17 Thunder aircraft, A-29 Super Tucano aircraft and attack drones.

An Italian M-346

South African Company Develops

NEW DRONE PLATFORM

Milkor 380 MILKOR

DEFENCEWEB

South Africa's Milkor company is partnering with Germany's Aerodata AG to develop a new specialized platform for maritime surveillance, the AeroForce 380, which is based on the Milkor 380 unmanned aerial vehicle.

This medium altitude long endurance drone, tailored specifically for maritime surveillance and coast guard missions, can fly as high as 9,000 meters. It has enhancements that allow it to operate below 1,000 meters, which is ideal for maritime surveillance operations.

The drone can fly for up to 35 hours, ensuring extended mission coverage and increased operational efficiency, Milkor said. It can carry up to 250 kilograms. It has sensors, a ship positioning system and side-looking airborne radar.

Company officials said it also will be useful for target acquisition and reconnaissance missions. It can fly in manual mode and autonomously. The drone is 9 meters long with an 18-meter wingspan, resembling a glider.

"With a maximum take-off weight of 1,300 kilograms and the capability to carry mission-specific payloads, the AeroForce 380 has the potential to revolutionize surveillance aircraft fleets worldwide," Aerodata said.

AFRICAN MILITARY SPENDING UP 22%

DEFENCEWEB

African military spending rose by 22% between 2022 and 2023, with the Democratic Republic of the Congo seeing the biggest percentage increase to its military budget globally at 105% as the country battled multiple security threats.

The DRC has been in protracted conflicts, with an estimated 200 militias and armed groups operating in the region, and Red Tabara rebels aiming to destabilize neighboring Burundi.

In 2023, the DRC's military spending more than doubled to reach $794 million. The 2023 increase coincided with growing tensions with Rwanda and a move by the government to strengthen the DRC's armed forces after it demanded the early withdrawal of a United Nations peacekeeping mission.

South Africa has emerged as a key supplier to the DRC, with the Paramount company delivering 25 Maatla armored personnel carriers to the DRC police in 2023, and 20 Mbombe 4 carriers to the DRC military in early 2023. The DRC also is acquiring aircraft from Paramount and is receiving six Mwari intelligence, surveillance and reconnaissance platforms.

Congolese Soldiers go on patrol in Beni. AFP/GETTY IMAGES

African military spending totaled $51.6 billion in 2023, which was 22% higher than in 2022, the Stockholm International Peace Research Institute reported. The rise in 2023 can be attributed to the 20% increase in spending by Nigeria — the subregion's biggest military spender — and notable increases in spending by several other countries, such as South Sudan.

Nigeria's military spending was $3.2 billion in 2023. This included a supplementary budget that boosted the regular military budget by an additional 34%. The latest increase in Nigerian military spending comes against the backdrop of numerous ongoing security challenges.

South Sudan recorded the second-highest percentage increase in military spending globally in 2023. Its spending rose by 78% to reach $1.1 billion, after a 108% increase in 2022. The growth in spending can be attributed to escalating internal violence and the security challenges that have spilled over from Sudan's civil war.

KENYA MAKES STRIDES TOWARD

'NUCLEAR DREAM'

ADF STAFF

Kenya has announced plans to build a nuclear power plant at Kilifi on the coast with construction beginning in 2027 and the plant expected to be commissioned in 2034. South Africa is the only African country generating power from nuclear sources. Egypt and Ghana also have plans to build nuclear plants.

"The realization of the nuclear dream will place Kenya among the pioneers in Africa in generation of this kind of energy," Justus Wabuyabo, CEO of Kenya's Nuclear Power and Energy Agency, wrote for Business Daily. "The project presents Kenya with a rare opportunity to not only meet its electricity needs, but also to export surplus to the neighbouring countries, hence generating additional revenue."

The initial capacity of the plant is projected at 1,000 megawatts, or enough to power hundreds of thousands of homes.

Kenya has become a leader in low-carbon, renewable energy use with geothermal, hydropower, wind and solar sources accounting for 85% to 90% of its energy production. With rapidly expanding demand, the country is looking for new low-emission energy sources.

"In the current circumstances, nuclear energy is emerging as a compelling solution to power needs as it offers a clean, reliable and low-carbon alternative to fossil fuels," Soipan Tuya, Kenya's cabinet secretary for environment, climate change and forestry, said in 2023. "In Kenya, by 2040, the demand for electricity will exhaust current generation capacity, making a powerful case for urgent adoption of nuclear power."

To support this effort, Kenya is hosting the second U.S.-Africa Nuclear Energy Summit. The summit is designed to support an exchange of ideas between African and U.S. experts on topics including training the nuclear workforce, safety measures and financing of plant construction. Speakers include the head of Oak Ridge National Laboratory, the U.S. commissioner of the Nuclear Regulatory Commission and a representative from the U.S. Department of Energy.

"This forum presents a unique opportunity for Kenya to articulate its vision for nuclear power and forge stronger ties with our American counterparts," Wabuyabo said.

GHANAIAN COURSE PREPARES SOLDIERS FOR

MULTIDOMAIN WARFARE

ADF STAFF

A new course on multidomain operations (MDO) at Ghana Armed Forces Command and Staff College is preparing Soldiers for the next generation of warfare.

During a commencement ceremony for the first class, staff college Commandant Maj. Gen. Matthew Kweku Essien said there has been a paradigm shift in how wars are fought, and it is vital for the GAF to keep pace with new technology and strategies.

He said war no longer can be viewed as taking place only on the three traditional domains of land, air and sea.

"In an era where the boundaries between land, subsurface, sea, air, space, electromagnetic spectrum and cyberspace are increasingly blurred and overlapping, it is imperative for African armed forces to evolve, adapt and excel in operating across these multiple domains seamlessly and effectively," Essien told students.

Essien said the future of war will demand agility, innovation and integration across all domains, and he urged participants to be flexible in the face of evolving threats and challenges.

The first MDO course ended in June 2024 and graduated 98 students from 17 African countries. Students in the course were from Benin, Botswana, Burkina Faso, Côte d'Ivoire, The Gambia, Ghana, Guinea, Liberia, Malawi, Namibia, Nigeria, Rwanda, Sierra Leone, South Africa, Tanzania, Togo and Zambia.

The course dealt with new technologies such as artificial intelligence, robotics, cyberattacks and hypersonic weapons. It also taught attendees about operational designs, psychological challenges faced by commanders, informational warfare, and command and control structures of multidomain operations.

Essien commended the course for helping armed forces "develop not only the right acumen and posture, but also the penchant for enhancing the operational effectiveness of the Armed Forces through research and development."

Maj. Gen. Matthew Kweku Essien, commandant of the Ghana Armed Forces Command and Staff College, speaks to students at the multidomain operations course. GHANA AIR FORCE PUBLIC RELATIONS

UPDF

UPDF LAUNCHES

DRIVE TO RECRUIT 1,600 SCIENTISTS

ADF STAFF

A Uganda Peoples' Defence Forces physician examines samples in a laboratory at a civil-military medical event in Mbarara, Uganda.

The Uganda Peoples' Defence Forces (UPDF) launched a campaign to recruit more than 1,600 people with special skills in scientific fields to bolster the military's technical capabilities and integrate technology.

"We are looking for young, bright minds to join our forces and contribute to the scientific and technological advancement of the UPDF," said Brig. Gen. Felix Kulayigye, defense forces spokesperson.

The recruitment process was expected to last 14 days and take place across the country. The UPDF looked for applicants younger than 28 with passing grades in a science subject at the Uganda Advanced Certificate of Education level. Recruiters also looked for people with diplomas or degrees in science-related fields. The UPDF is recruiting people with skills in engineering, aircraft maintenance, electricity, masonry, carpentry, cybersecurity and other fields.

"Our aim is to build a robust and versatile defense force capable of tackling contemporary challenges," Kulayigye said.

In 2009, the country established the Uganda Military Engineering College to develop engineering, technology and any other scientific capabilities in the UPDF. In recent years, the UPDF has established an unmanned aerial vehicle workshop and partnered with the Ministry of Information and Communications Technology to set up an innovation hub in Kampala.

Ugandan President Yoweri Museveni spoke to a group of scientists who took a two-month basic military training course at Sera-Kasenyi Training School in 2023 and said he wants to see more people with science skills in the armed forces.

"We value the educated young people, and we want them for our institutions, especially the scientists," he said. "The educated people including the social scientists have improved the quality of our army."

Ghanaian Sailors in the presidential honor guard prepare to greet President Nana Akufo-Addo at the African Maritime Forces Summit and Naval Infantry Leadership Symposium Africa in Accra. CPL. ADDYSYN TOBAR/U.S. MARINE CORPS

Ghana Armed Forces Pushes for More Women in Upper Ranks

ADF STAFF

Happy Delight Abajongawo was the first in her family to join the Ghana Armed Forces when she enlisted in the Navy 15 years ago. She would like to see more women follow her lead.

"We need more women in the military," Petty Officer Abajongawo, a clerk, told ADF. "We should encourage females to join because it's better to be in the military than to be at home not working. Being in the military, you are taking care of yourself and getting more opportunities."

Ghana enlisted its first female member in 1958. Since then, women like Abajongawo have continued to don their country's uniform in growing numbers.

The 16,000-person military is about 15% female. That number is significantly higher than the United Nations' goal of 9% female participation for peacekeeping operations, but still behind the Ghanaian military's own goal of having 25% female recruits by 2028 and eventually reaching a ratio that reflects the country's nearly even gender split.

"Recruiting more women is to ensure the military reflects the society," Rear Adm. Issah Yakubu, chief of naval staff for the Ghana Navy, told ADF. "Both genders bring different perspectives to the system. We want to give equal opportunities to all Ghanaians."

The role of women was front and center in the Ghana Armed Forces when President Nana Akufo-Addo addressed the African Maritime Forces Summit and Naval Infantry Leadership Symposium Africa in Accra. The president's honor guard was made up mostly of women.

Recruiters are particularly focused on increasing female enlistment in the military's combat units, where they have been underrepresented.

Female recruits serve largely in administrative, medical and logistical roles, according to Group Capt. Theodora Agornyo, gender policy advisor to Ghana's chief of defense staff. Agornyo has been part of the team speaking to high school students about joining the military.

From left, Capt. Esinam D. Baah, Group Capt. Theodora Agornyo and Commodore Faustina Anokye of the Ghana Armed Forces attend a U.N. event on women, peace and security. UNITED NATIONS

"In conflict situations and post-conflict situations when solutions are being found, women need to have a voice," Agornyo told GTV Ghana.

Increasing women's roles in combat units increases their presence on peacekeeping missions while also putting more women on a path to leadership positions.

"We can and must do better because equality for women is progress for all," Commodore Faustina Boakyewaa Anokye, the highest ranking female officer in the history of the Ghana Navy, said during a U.N. event. "Let us embrace equity and invest in women for accelerated growth."

A Somali Soldier stands beside a prison cell where pirates are being held in Garowe. REUTERS

KENYA PLEDGES TO PROSECUTE PIRATES

ADF STAFF

Kenya has reaffirmed its commitment to prosecute suspected pirates and other sea criminals amid roiling insecurity sparked by a surge in Somali pirate attacks and Yemen's Houthi rebels.

Kenya will prosecute pirates captured by the European Union Naval Force (EUNAVFOR) during operations in the Indian Ocean and the Gulf of Aden. EUNAVFOR does not have the authority to prosecute or detain suspects for long without formal charges.

Vice Adm. José M. Núñez, EUNAVFOR operation commander, said reliable prosecutions can have a "huge deterrent effect" on piracy.

Somali piracy began resurging in late 2023 after a six-year lull that was attributed to coordinated anti-piracy naval operations, safety measures such as armed guards on ships, and increased prosecution and imprisonment of pirates.

"Legal finish is engrained in our DNA, in our operational DNA," said EUNAVFOR legal advisor Lt. Col. Rodrigo Lorenzo. "We seize the cargo, we detain the suspects and then turn to any of the coastal states willing to prosecute the suspects."

Seychelles also has agreed to prosecute sea criminals detained by EUNAVFOR.

The converging Somali pirate and Houthi attacks are disrupting global trade. Every year, 20,000 vessels pass through the Gulf of Aden on their way to and from the Red Sea and the Suez Canal — the shortest maritime route between Europe and Asia.

Isaiah Nakoru, who heads Kenya's Department for Shipping and Maritime Affairs, said his country is eager to promote security and the free flow of goods and people.

"We have to work together to ensure that we achieve the aspiration for ensuring there is sustainability and security, and all activities that threaten the livelihoods of people and movements of people have to be addressed in partnership with all those who have a stake," Nakoru told Voice of America.

Since 2012, Seychelles has prosecuted 17 piracy cases and Kenya about 19, according to the Danish Institute for International Studies.

Nigerian Army Takes to Skies With Aviation Unit

ADF STAFF

The Nigerian Army has inaugurated its long-awaited aviation unit with the addition of two Bell UH-1 "Huey" helicopters. The new air assets will give the Army the ability to evacuate injured Soldiers, conduct reconnaissance and provide aerial support to troops fighting terrorism.

In June 2024, Chief of Army Staff Lt. Gen. Taoreed Lagbaja inspected the helicopters at the Nigeria Police Air Wing of Nnamdi Azikiwe International Airport in Abuja. Lagbaja said the path to establishing the Army Aviation Wing began in 2014. "The journey, as predicted by the initial dreamers, has not been easy but here we are today by the grace of God, realising our dream," Lagbaja said, according to Politics Nigeria. "We are on our learning curve in the aviation business, and we hope it will be a pleasant experience that will enhance our operational successes."

Earlier in 2024, the Army announced it would build a $3.2 million hangar at Bola Ahmed Tinubu International Airport in Minna, Niger State. The hangar will house a number of Army aerial assets, including 12 MD530F Cayuse Warrior series attack helicopters, 10 drones and eight Magnus light attack aircraft. The platforms are expected to boost the Army's surveillance, reconnaissance and patrol capabilities, according to a Military Africa report.

In preparing to launch the unit, the Nigerian Army has trained pilots, aircraft engineers, technicians and ground support crews. The Army also partnered with the French Army's Light Aviation unit and the California National Guard in the U.S. to gain insight into what is needed to create an army aviation unit, Military Africa reported.

A Nigerian Army Aviation crew poses in front of their Bell UH-1 "Huey" helicopter and Army flag. NIGERIAN ARMY

Observers believe work remains to train pilots and others for a wide range of missions they might face. "The future of the Nigerian Army aviation will require soldiers to increase realistic training that effectively mimics hostile environments," Ekene Lionel wrote for Military Africa. "As the force shifts from counterinsurgency operations to large-scale combat operations, flexibility will be the Nigerian Army aviation's greatest strength. Army aviators will be applying hard-earned lessons from 10 years of operations in Nigeria's northeastern theatre."

U.N. Lists 5 Critical Peacekeeping Tools

UNITED NATIONS

Ghanaian peacekeepers patrol in Leer, South Sudan. AFP/GETTY IMAGES

In marking the International Day of U.N. Peacekeepers in May 2024, officials pointed to the increasing importance of "nontraditional tools" to help peacekeepers fulfill their duties. These tools are helicopters, engineering instruments, satellite imaging, mine detectors and radio broadcasts.

The U.N. regards helicopters as critical because they help peacekeepers reach remote villages, allow rapid response and evacuation during emergencies, deliver essential aid to communities in need, and provide aerial surveillance and reconnaissance. In some instances, weaponized helicopters can deter armed groups.

To truly build peace, peacekeeping focuses on people and their needs. The loss and lack of key infrastructure such as schools, medical facilities, roads and bridges hinders any efforts to help communities build sustainable peace. That's why engineers and combat engineers known as sappers are instrumental in helping people recover and rebuild.

In the past two decades, satellite imaging has given peacekeepers a good overview of conflict zones and enhanced situational awareness. Peacekeepers use satellite imagery to monitor troop movements, displacement trends and flows, potential threats and movements of armed groups, and impending natural disasters.

With such critical information, peacekeepers can make informed decisions, effectively plan patrols and coordinate responses. Satellite imaging helps enhance operational awareness in countries with vast, remote and difficult terrains. Real-time imagery of inaccessible regions also helps peacekeepers swiftly assess needs and prioritize interventions accordingly.

Mine detectors have played a crucial role in saving countless lives worldwide. Land mines kill or maim mostly civilians. Today, nearly 70 countries and territories have land mines. The U.N. Mine Action Service deploys deminers to nearly 20 countries and territories, including in peacekeeping missions, to detect and destroy the mines.

Radio has played a vital role in many peacekeeping missions since the late 1980s. Today, three peacekeeping missions have their own stations. Peacekeepers use radio for vital news, early warnings about potential threats, discussions of pertinent issues and educational programs. They also provide an invaluable platform for local voices and perspectives, helping to foster reconciliation among divided communities.

ATMIS Trains Police to Fight Crime

ATMIS

The African Union Transition Mission in Somalia trained criminal investigation officers from Hirshabelle State to help them detect and combat financial crimes and disrupt terrorism financing ahead of the mission's withdrawal from the country.

The mission, known as ATMIS, employed its police component to train the officers in theoretical and practical sessions. Officers improved their skills on financial intelligence, detecting money laundering, investigating corruption and fraud, and understanding investigative methods and procedures.

"ATMIS recognises the need to build the capacity of our Somali counterparts and provide them with knowledge in the face of the ever-growing trend of financial crimes and terrorism financing in Africa and globally," said Assistant Superintendent of Police Ernest Agbo, ATMIS' lead police trainer in Jowhar, the capital of Hirshabelle State. "We are happy with the outcome of the training. This was evident during the question-and-answer sessions, where the officers displayed a high level of commitment. We are confident they are now well equipped to detect and stop illegal financial dealings and win the war on terrorism."

The Hirshabelle State police traffic commander, Col. Hassan Daud, thanked ATMIS for the continued support and mentorship of the Somali Police Force.

"I urge the officers to make efficient use of the skills they have acquired and request ATMIS to conduct more training and mentorship programs for us," he said.

ATMIS was formerly the African Union Mission to Somalia. The mission is in the process of handing over security operations to the Somali National Armed Forces. The mission consisted of troops from Burundi, Djibouti, Ethiopia, Kenya and Uganda. It initially deployed 17,000 troops.

Somali police officers graduate from ATMIS training. ATMIS

Operation Tiger Paw Destroys Militia Checkpoints

ADF STAFF

MONUSCO peacekeepers patrol near Rangira in North Kivu in the eastern Democratic Republic of the Congo. REUTERS

Intelligence, boosted by surveillance and reconnaissance drones, helped United Nations peacekeepers identify and destroy at least eight militia checkpoints in the Democratic Republic of the Congo.

This was part of Operation Tiger Paw launched in mid-May 2024. The U.N. Organization Stabilization Mission in the Democratic Republic of the Congo, known as MONUSCO, said the mission was launched after "meticulous planning" involving DRC troops and local authorities in the Ituri district and residents, defenceWeb reported.

Troops from Bangladesh and Nepal were drafted into the MONUSCO detachment for Tiger Paw. The operation was designed to identify and destroy checkpoints for Codeco, an association of various Lendu militia groups operating within the DRC. The removal of these checkpoints meant "an important axis" connecting a number of villages was opened up, MONUSCO's Lydie Betyna reported.

On May 21, 2024, DRC troops coordinated with peacekeepers and patrolled Ivo Djugu, Lenga, Gali, Plateau Savo, Lida, Jippi and Pimbo, according to the U.N. "The village of Arr, known as the epicenter of insecurity in the areas, was subject to particular attention by the patrols," the U.N. noted. "The aim was to map out the area before a robust intervention."

Soldiers identified the first illegal checkpoint in the direction of Uzi Hill after a cordon and search operation. It was destroyed. After clearing more than 1.5 kilometers near Uzi Hill, the patrol discovered and destroyed a second checkpoint and a third checkpoint manned by Codeco militiamen, who opened fire before being shelled by mortar fire from peacekeepers, the U.N. said.

The patrol moved on to the village of Tchoru, then on to Pitso, where it was joined by a Nepalese patrol. Between the villages of Tchoru and Pitso, the patrol destroyed five other unmanned Codeco checkpoints.

IN 20TH YEAR, AFRICAN LION STRENGTHENS PARTNERSHIPS

ADF STAFF

A member of the Libyan Armed Forces looked across the vast desert in Ben Ghilouf, Tunisia, and watched a military helicopter obliterate a ground target. As smoke billowed, he confirmed the target's destruction by radio and watched the helicopter fly away.

The Soldier was one of 8,000 participants from 27 countries who trained during the 20th annual African Lion military exercise hosted in Ghana, Morocco, Senegal and Tunisia between April 20 and May 31, 2024. African Lion seeks to bolster defense capabilities and foster interoperability among participating nations.

In Dodji, Senegal, exercises included combined infantry tactics and a medical exchange led by the U.S. Marine Forces Reserve. The exercise also let local communities engage with visiting forces to help strengthen civil-military relations. Also in Senegal, the Royal Netherlands Army and the Senegalese Armed Forces completed combat lifesaver exchange training led by U.S. Navy Cmdr. Evelyn Palm, a Ghana native.

Other joint training exercises focused on field hospital operations, medical evacuations and humanitarian assistance. Emphasized throughout the exercise was a whole-of-government approach to address the root causes of instability, rather than just focusing on military might.

During the exercise, Ghanaian and U.S. troops offered medical services to locals in Damongo, in the country's grassy woodland Savannah Region.

A Royal Moroccan Air Force helicopter takes off during the African Lion 2024 military exercise. AFP/GETTY IMAGES

NAVAL LEADERS CALL FOR NEW MARITIME LAWS

ADF STAFF

Armed pirates captured a fishing vessel just outside Sierra Leone's port in August 2023. Sierra Leonean, Liberian and Ivoirian coast guards came together to catch the pirates and free the crew.

As the hijacked boat fled, Sierra Leone's coast guard handed the pursuit to Liberia. After a brief firefight, Liberian forces seized the vessel, rescued the 23 crew members and arrested two of the 13 pirates. The others escaped on an inflatable boat. Liberia prosecuted the pirates under its antipiracy law, charging them with criminal conspiracy and armed robbery, among other crimes, Liberia Navy Capt. John Willie told attendees at the 2024 African Maritime Forces Summit and Naval Infantry Leadership Symposium-Africa in Accra in May.

Rear Adm. Issah Adam Yakubu, Ghana's chief of naval staff, speaks at the 2024 African Maritime Forces Summit.

LANCE CPL. GARRETT GILLESPIE/U.S. MARINE CORPS

Willie and Commodore Philip Juana, chief of naval staff for Sierra Leone, said the hijacked fishing vessel is an example of how African nations can work together to fight maritime crime, particularly in the pirate-plagued Gulf of Guinea. However, Juana added, cooperation at sea is only part of fighting maritime crime. Countries also must align their laws with regional and international standards to ensure that criminals are brought to justice.

Sierra Leone lacks the legal framework it needs to prosecute maritime criminals, Juana said. So far, only a few African counties have legal frameworks to punish piracy. Nigeria was the first African country to pass anti-piracy legislation in 2021.

Kenya, European Union Hold Joint Exercise

ADF STAFF

For the first time, the Kenya Navy and Kenya Coast Guard Service joined in the European Union's Operation Atalanta multiagency exercise, Usalama Baharini.

The main objective of the May 2024 joint exercise — whose Swahili name translates to "Safety at sea" — was to improve maritime security, cooperation and dialogue on regional peace and security issues. Operation Atalanta, formally European Union Naval Force Somalia, is an ongoing counterpiracy military operation off the Horn of Africa and in the Western Indian Ocean. It is the first naval operation conducted by the EU in support of 2008 U.N. Security Council resolutions.

Seminars included lectures on the legal aspects of operations at sea and maritime interdiction operations. The practical component, with Atalanta flagship ITS Martinengo taking center stage, saw Usalama Baharini participants apply training, knowledge and experience in simulated scenarios, defenceWeb reported. The ship posed as a pirate vessel used to transfer equipment, materials, and personnel suspected of involvement in arms and drug trafficking.

Simulations involving helicopters, high-speed boats and drones let participants apply protocols and best practices to real-life scenarios. Special attention was given to prosecuting pirates, given the ongoing maritime security challenges in the Red Sea and resurgence of regional piracy.

"Kenya and the EU have a common border — the sea — and the security and stability of the sea is the security and stability of our societies," Italian Vice Adm. Ignacio Villanueva Serrano, Atalanta operations commander, said of the exercise, as reported by defenceWeb. "We must open our eyes to the sea."

A Kenya Navy vessel, right, approaches Atalanta flagship ITS Martinengo during Usalama Baharini.

EUROPEAN UNION NAVFOR

AFP/GETTY IMAGES

THE NUBIAN KING WHO RULED EGYPT

ADF STAFF

Pharaoh Taharqa was devoted to tradition. He built pyramids. He embraced titles, spoke the Egyptian language and used its writing system as his medium of record. He took on ambitious construction projects and was committed to the revitalization of Egyptian religious sites.

But Taharqa, who ruled from 690 B.C. to 664 B.C., was not Egyptian. He was a Nubian from the Kingdom of Kush in what is now Sudan. He was one of the Nubian pharaohs of the 25th Dynasty. They ruled Egypt for almost 100 years.

The dynasty's rise to power in Egypt began with King Piye of the Kush empire, who invaded Egypt and captured Memphis, the capital, in 727 B.C. He declared himself pharaoh, but the conquest was not complete until his successor, Shebitku, fully established Kushite control over Egypt.

Egypt was losing power and prestige when the Nubians arrived. They sought to restore the kingdom to its former glory, and reunified Lower Egypt, Upper Egypt and, along with Kush, created the largest Egyptian empire since the New Kingdom era ended about 1070 B.C.

Taharqa succeeded Shebitku, but his kingdom was forever in the shadow of the Assyrian Empire, in what is now Iraq and other parts of the Middle East. Assyrian King Esarhaddon led several campaigns against Taharqa and attempted to conquer Egypt in 673 B.C. Hoping for a surprise attack, Esarhaddon marched his Soldiers at great speed, and they were exhausted by the time they reached the city of Ashkelon.

This statue of Pharaoh Taharqa is in the Louvre Museum in Paris.

In the ensuing battle, the Assyrians were slaughtered.

The defeat was so complete that Esarhaddon abandoned his plans to conquer Egypt for two years. When at last he returned, his army was much larger and was marched at a slower pace to conserve its energy. He took Memphis, confiscated Egypt's crown jewels and concubines, and captured members of the royal family, including Taharqa's son and wife. During the time that Esarhaddon controlled Egypt, his empire was the largest in the world.

When Esarhaddon returned to Assyria, Taharqa began plotting revolts against him throughout Lower Egypt and beyond. Within two years he reoccupied Memphis as well as the Nile Delta, and began working with the king of Tyre in what is now southern Lebanon. Together with the Kingdom of Tyre, Taharqa routed the local puppet rulers Esarhaddon had appointed.

Despite the incessant threat of Assyria, Taharqa's reign is considered a great success. He was the recipient of some good luck in the form of abundant rain that flooded the Nile and produced ample crops for years. But historians say he also was a smart, efficient ruler and continued the Nubian Pharaohs' tradition of constructing and restoring temples and other buildings. Historian Caroline Armstrong described him as "the greatest builder among the Kushite rulers." His new temples spurred the growth of "temple towns," which served as local centers of government and hubs for commerce.

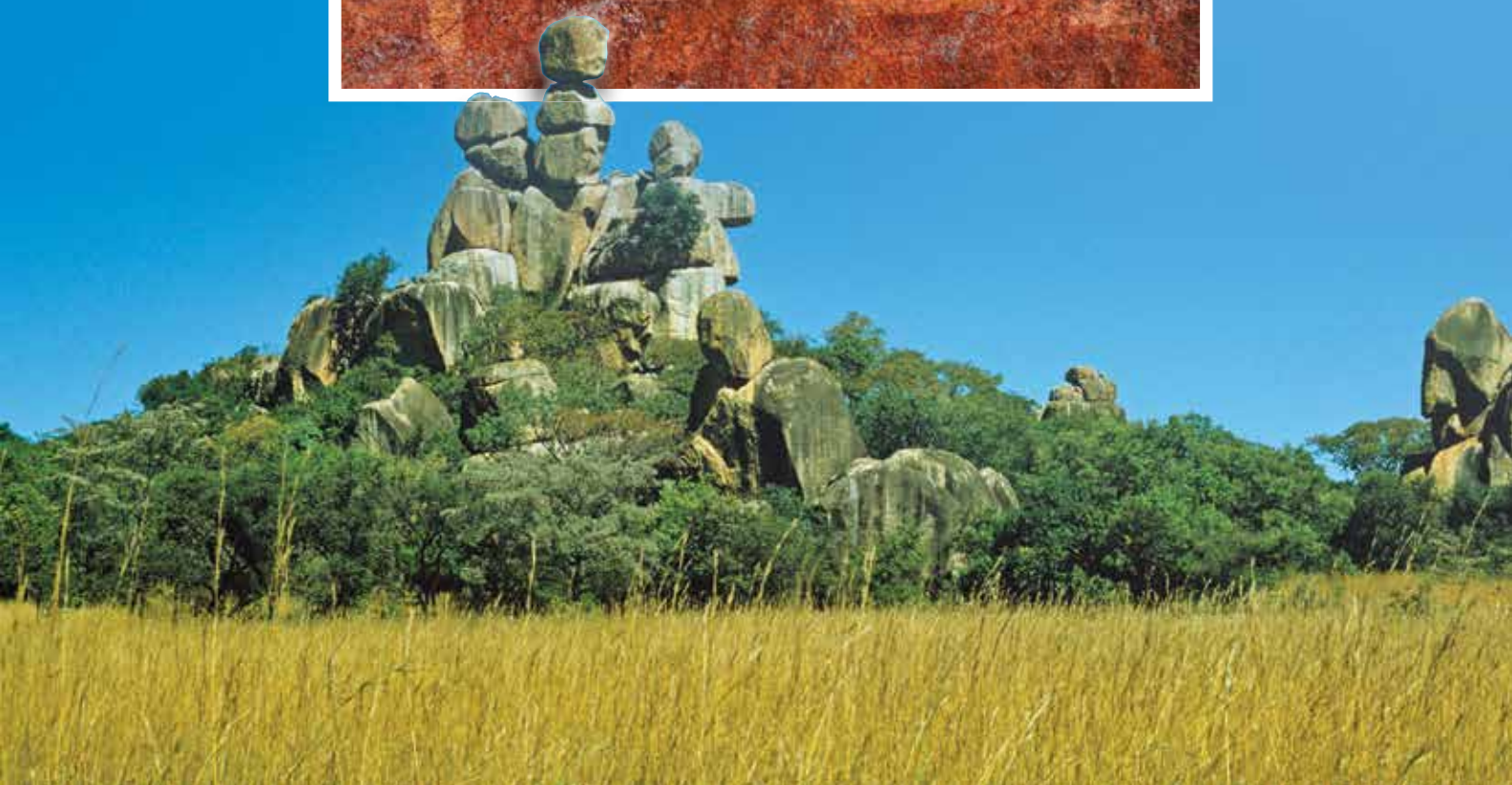
Taharqa's love of Egyptian culture was such that he commissioned the first pyramid in Kush, in Nuri on the west side of the Nile, in what is now the Northern state of Sudan. He was responsible for an unprecedented level of integration of the Egyptian and Kush cultures as evidenced by the revival of architecture, arts and religion to older, higher standards. He rebuilt and expanded temples and monuments at Karnak, Kawa and Jebel Barkal — monuments that survive to this day.

Despite his cultural achievements, Taharqa could not stop the Assyrian Empire. After Esarhaddon died, his successor drove Taharqa out, forcing him to retreat to Upper Egypt and finally to Kush. When he died in 664, he was buried in his pyramid in Nuri.

WHERE AM I?

CLUES

1. This site has one of the highest concentrations of rock art in the region, dating back at least 13,000 years.
2. Archaeological evidence indicates the area has been occupied for at least 500,000 years.
3. The rock formations are seen as the seat of ancestral spirits.
4. The paintings represent evolving artistic styles and socio-religious beliefs.



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