

# **FUTURE ARTILLERY**

## **ARTILLERY MARKET REPORT 2024-2028 SELECTED COUNTRIES:**



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# OVERALL TRENDS

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The global artillery systems market (selected countries) is expected to increase from US\$8.5 billion in 2023 to US\$10.3 billion in 2028, at a CAGR of 3.9%. This growth is mainly driven by the U.S., Poland, India, Germany, Romania, South Korea, Egypt, Finland, Netherlands, and the UK, who are the top 10 spenders.

The major programmes include Poland's procurement of 672 K9 howitzers and related systems for US\$10.2 billion, 18 HIMARS and related systems for US\$10 billion and 288 K239 Chunmoo Rocket Launchers (WR-300 Homar programme) for US\$3.6 billion; the U.S.' Paladin Integrated Management (PIM) - US\$10.1 billion and Guided Multiple Launch Rocket Systems (GMLRS) - US\$7.4 billion; Romania's procurement of 90 155mm self-propelled howitzers for US\$2.2 billion, and 18 HIMARS from Lockheed Martin for US\$1.5 billion; Germany's replacement of the Indirect Fire Support Medium Range Artillery system at a cost of around US\$1.8 billion; and India's procurement of K9 Vajra self-propelled howitzers (SPHs) for US\$1.4 billion and Advanced Towed Artillery Gun Systems (ATAGS) for US\$1 billion.

Lockheed Martin's HIMARS, Hanwha Defense's K9 Thunder and Nexter's Caesar are the most popular artillery platforms globally. In fact, the combined spending on these three platforms over the period 2023-2028 accounts for around 39% of the total market.

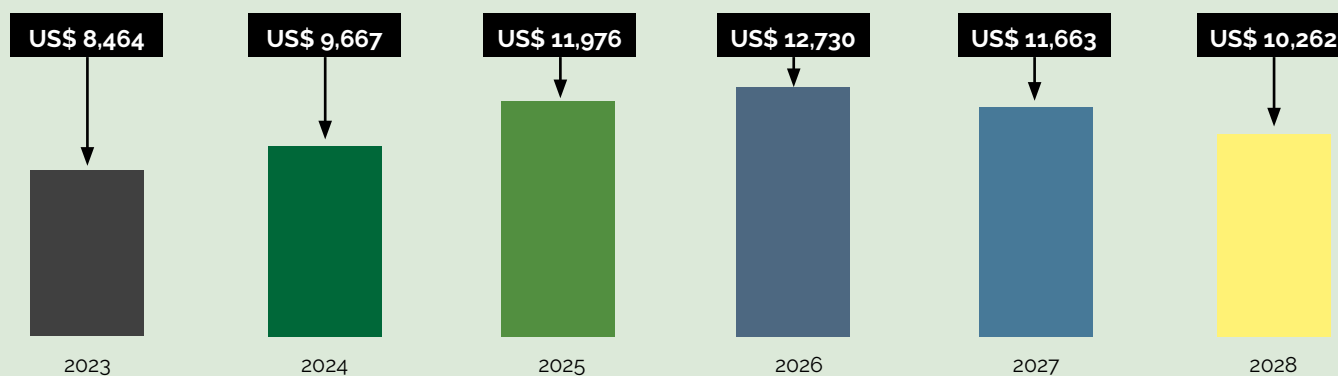
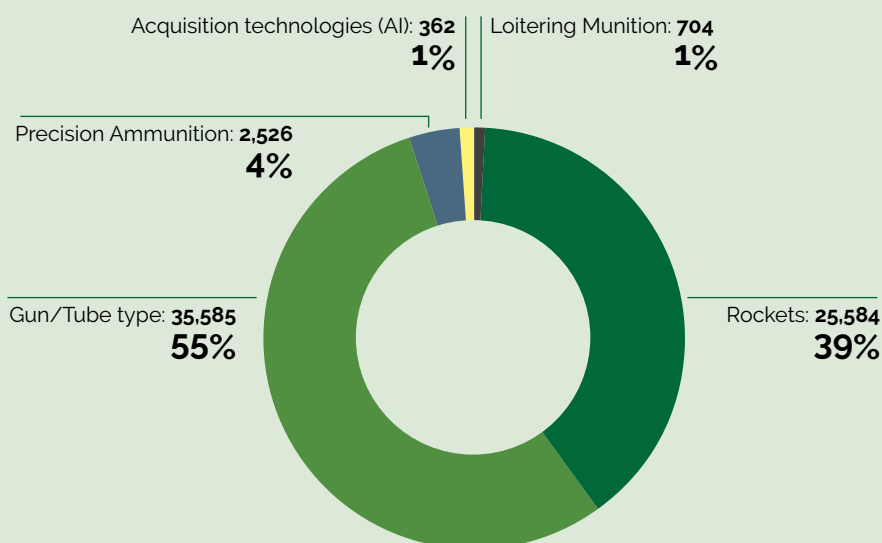
Russia's invasion of Ukraine and the proven efficacy of self-propelled and towed artillery platforms in the conflict, is the market's major growth driver. In fact, both Russia and Ukraine are using more artillery ammunition than they can buy or manufacture, with a recent BBC article estimating as many as 32,000-35,000 shells being used every day. Therefore, the U.S. has announced plans to boost its production of artillery shells by as much as 500% over the next two years, to not only make up for shortfalls caused by the Ukraine war but also build stockpiles for future conflicts.

Other territorial disputes among some countries in Europe is yet another factor driving the market for artillery systems. Moreover, the future augurs well for the procurement of artillery systems owing to the fast-changing nature of the modern battlefield which is expected to feature high intensity and high tempo warfare and greater use of precision weapons to minimise collateral damage.

Traditionally, artillery systems have been cheaper as compared to other military platforms. However, the integration of advanced technologies and sub-systems such as precision weapon guidance, command and control systems, complex data systems and launcher units, have resulted in a sharp increase in costs.

**TABLE 1: GLOBAL: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**

Types	2023	2024	2025	2026	2027	2028	Total
Rockets	4,305.1	5,554.2	6,912.3	7,241.7	6,620.8	5,256.1	<b>35,890.2</b>
Gun/tube type artillery	3,570.6	3,618.9	4,385.4	4,833.4	4,457.4	4,413.6	<b>25,279.1</b>
Precision ammunition	343.0	270.8	461.1	508.4	471.7	470.9	<b>2,526.0</b>
Loitering munitions	173.4	140.6	120.0	111.0	78.0	81.0	<b>704.0</b>
Target acquisition technologies (AI)	72.0	83.0	97.0	35.0	35.0	40.0	<b>362.0</b>
<b>Total</b>	<b>8,464.1</b>	<b>9,667.5</b>	<b>11,975.7</b>	<b>12,729.5</b>	<b>11,662.9</b>	<b>10,261.6</b>	<b>64,761.3</b>

**FIGURE 1: GLOBAL: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS****FIGURE 2: GLOBAL: ARTILLERY MARKET SHARE BY TYPE, 2023-2028, US\$ MILLIONS, %**

# FINLAND



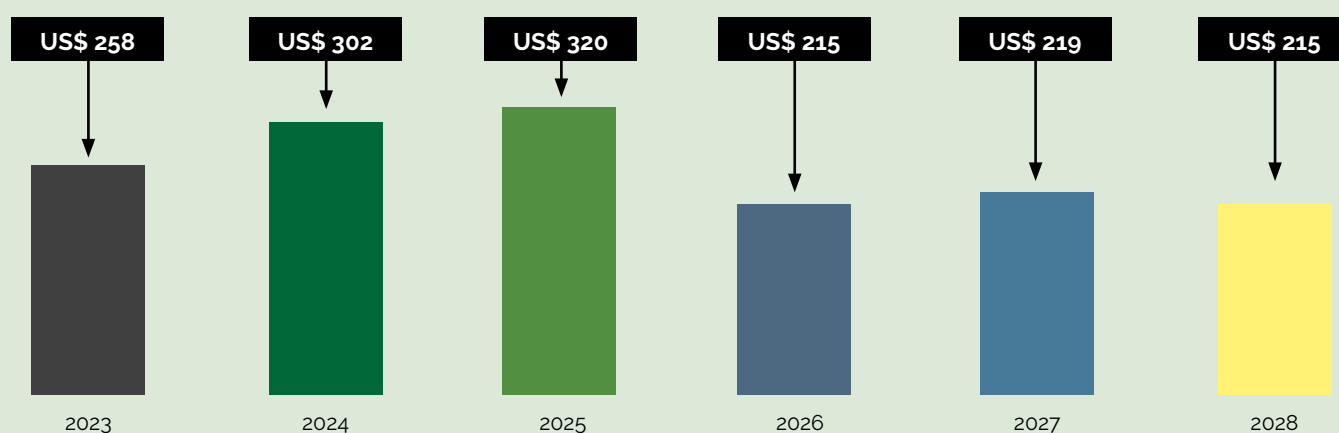
Even though Finland has one of the smallest armies in the world, it makes up for it with its strong logistical systems and mine warfare and artillery capabilities. Finland has one of the biggest artillery forces in Europe with around 1,500 operational systems estimated in 2022. Moreover, its 800-mile border with Russia and lack of NATO's membership means that it always needs to augment its force projection capabilities. As such the country is undertaking various artillery procurements from international suppliers such as Hanwha Techwin, Elbit Systems, and Lockheed Martin. It also manufactures 155 mm projectile shells, hollow charges, and target acquisition systems through local companies Nammo Lapua Oy and Senop.

Finland's major artillery programmes include Guided Multiple Launch Rocket Systems (GMLRS) and related equipment from Lockheed Martin for US\$535 million, the upgrade of existing M270A2 Multiple Launch Rocket Systems (MLRS), 91 used and new Kg Thunder Howitzers from South Korea for US\$329 million, 155 mm artillery ammunition from Nammo Lapua Oy for US\$110 million, an undisclosed number of Extended Range GMLRS - Alternative Warhead and ER GMLRS - Unitary (ER GMLRS-U) rockets from Lockheed Martin for US\$79 million, 122-mm Long-Range Rockets from Elbit Systems for US\$75 million, and target acquisition systems from Senop for US\$33 million. Cumulatively, the Finnish artillery systems market is expected to value US\$1.5 billion over the period 2023-2028.

**TABLE 2: FINLAND: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**

Types	2023	2024	2025	2026	2027	2028	Total
Rockets	159.6	175.0	204.5	185.0	219.2	215.0	<b>1,158.3</b>
Gun/tube type artillery	83.1	112.0	102.0	30.0	-	-	<b>327.1</b>
Loitering munitions	5.0	5.0	-	-	-	-	<b>10.0</b>
Target acquisition technologies (AI)	10.0	10.0	13.0	-	-	-	<b>33.0</b>
<b>Total</b>	<b>257.7</b>	<b>302.0</b>	<b>319.5</b>	<b>215.0</b>	<b>219.2</b>	<b>215.0</b>	<b>1,528.4</b>

**FIGURE 3: FINLAND: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**



## KEY PROGRAMMES:

### Guided Multiple Launch Rocket Systems (GMLRS) and Related Equipment

In November 2022, the U.S. State Department approved the sale of various Guided Multiple Launch Rocket Systems (GMLRS) and related equipment to Finland. The US\$535 million contract expected to be awarded to Lockheed Martin Corp, Missile and Fire Control, will include 150 M30A1 GMLRS-AW or M30A2-AW Missile Pods with an Insensitive Munitions Propulsion System (IMPS), or a combination of the two and 250 M31A1 GMLRS Unitary (GMLRS-U) Warhead (Steel Case), or M31A2 GMLRS-U IMPS, or again, a combination of the two. This procurement is critical to Finland's national security, especially given the volatile security environment in Europe caused by Russia's invasion of Ukraine. According to the latest updates, the official contract has not been awarded yet, but is expected to go through early in 2024.

### K-9 Thunder Howitzers (New and Used)

In 2017, the Finnish Ministry of Defence (MoD) procured 48 used K-9 Thunder howitzers that were in service with the South Korean army. The US\$157 million contract included training, spare parts, and maintenance schedules, along with an option to procure five more. These systems will replace the country's ageing artillery systems that are expected to be decommissioned in the next decade and more. The first consignment was delivered at the Finnish port of Vuosaari (Helsinki), in February 2018. Deliveries of all 48 systems are expected to be completed in 2024. In October 2021, Finland exercised its option to purchase an additional five new K9 155 mm self-propelled howitzers for a total consideration of US\$35 million, with deliveries expected to be completed by 2025. Then in November 2022, the government decided to purchase 38 additional used systems at a cost of around US\$137 million to further boost the army's firepower and existing strike capabilities. These systems are also expected to be delivered latest by 2025-2026.

### Extended Range GMLRS - Alternative Warhead and ER GMLRS - Unitary (ER GMLRS-U) Rockets

In February 2022, the Finnish MoD gave the approval to purchase ammunition for its 22 Guided Multiple Launch Rocket Systems (GMLRS) manufactured by Lockheed Martin. This US\$79 million deal will include Extended Range GMLRS - Alternative Warhead (ER GMLRS-AW) and ER GMLRS - Unitary (ER GMLRS-U) rockets, both with a range of over 150 kilometres. Deliveries are expected to start in 2025.

### 122 mm Long-Range Rockets

In December 2022, the Finnish MoD announced that it had signed a US\$74 million contract to purchase an undisclosed number of 122 mm long-range rockets for its light RAKH 89 M1 (RM-70/85) rocket launchers. These artillery systems

were originally manufactured in the Czech Republic, known as Czechoslovakia at the time, under the designation RM-70. 36 of them were acquired by Finland in 1991 from former East German stocks, of which 34 pieces are estimated to be still in use. The wheeled RAKH 89 M1 system has 40 pieces of 122mm tubes, with an original range of around 20 km. The new long-range rockets however are expected to increase this to over 30 km. Final deliveries are expected to take place in 2025.

### 155 mm Artillery Ammunition

In March 2023, the Finnish Ministry of Defence (MoD) announced the procurement of an unspecified number of 155 mm artillery ammunition from domestic manufacturer Nammo Lapua Oy. According to the country's defence minister Antti Kaikonen, this US\$110 million purchase will expand the current stockpile of 155 mm artillery shells of the Finnish Defence Forces, improve "security of supply", and allow the industry to increase the production capacity of ammunition production. Final deliveries are expected to take place no later than 2026.

### M270A2 Multiple Launch Rocket System (MLRS) – Upgrade

In August 2023, the U.S. State Department approved a Foreign Military Sale (FMS) to the Finnish Government, for the upgrade of an unspecified number of M270A2 Multiple Launch Rocket Systems (MLRS) and related equipment. The US\$395 million programme includes the upgrade of intercom systems, radio communication mounts, machine gun mounts, battle management system vehicle integration kits, publications for MLRS, spares, services, support equipment, and other related elements of the programme and logistics support. The U.S.' approval is in line with its foreign policy and national security strategy, which also aims to enhance the security of North Atlantic Treaty Organization (NATO) allies. This programme will also augment Finland's interoperability with the U.S and other allied forces. The principal contractors include Lockheed Martin, Chelton, Leonardo DRS, and Loc Performance Products.

### Multiple Launch Rocket System Family of Munitions – Industrial Engineering Services

In November 2023, the U.S. DoD awarded a US\$199.2 million contract to Lockheed Martin, to provide industrial engineering services for the U.S.' and Finland's Multiple Launch Rocket System Family of Munitions programmes. The company emerged as a sole bidder for this program, with the work expected to be carried out across various states including Texas, New Mexico, Alabama, Arkansas, Pennsylvania, Florida, Vermont, New Jersey, Arizona, and Mississippi. The contract is scheduled for completion by November 2028, with Finland spending around US\$80 million.



# FRANCE

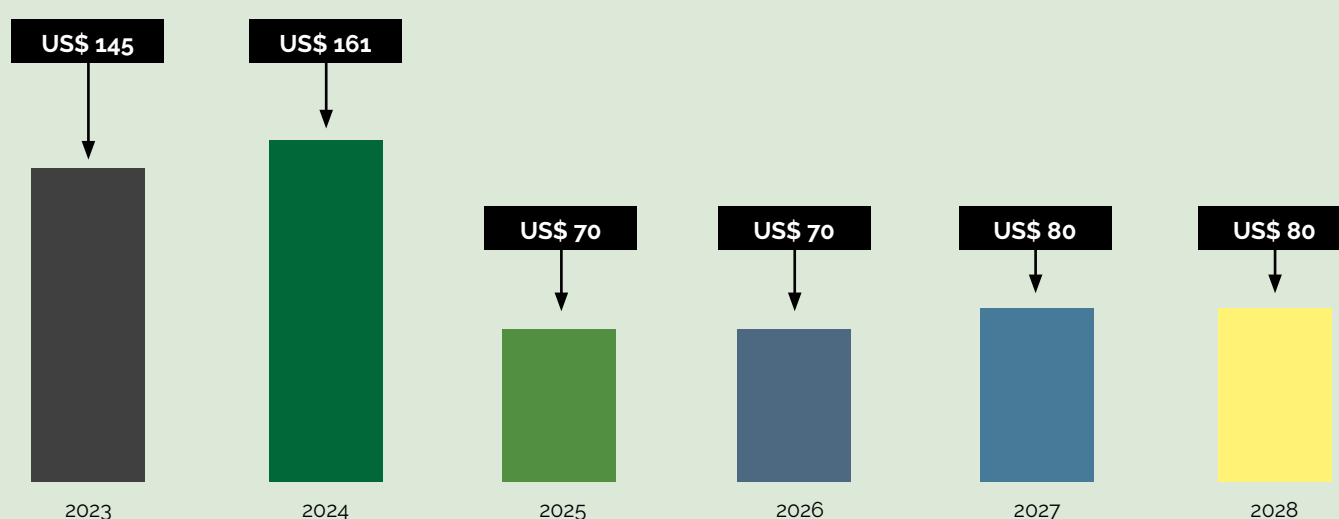


France is one of the major manufacturers of artillery systems in Europe with its flagship Caesar 155mm MK series SPH developed by Nexter. It is expected to buy 18 MK1 systems for US\$100 million, and 109 MK2 systems for US\$650 million, with around US\$536 million expected to be spent over the forecast period. Additionally, the country has set up a US\$217 million fund for arms transfers to Ukraine, out of which around US\$66 million is expected to be spent on the procurement and delivery of 12 MK1 SPHs to the embattled nation. Other programmes include 155mm shells for US\$10 million, and the procurement of loitering munitions under the Larinae and Colibri programmes. Cumulatively, the French artillery systems market is expected to value US\$606 million over the period 2023-2028.

**TABLE 3: FRANCE: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**

Types	2023	2024	2025	2026	2027	2028	Total
Gun/tube type artillery	120.0	136.0	60.0	70.0	80.0	80.0	546.0
Loitering munitions	25.0	25.0	10.0	-	-	-	60.0
<b>Total</b>	<b>145.0</b>	<b>161.0</b>	<b>70.0</b>	<b>70.0</b>	<b>80.0</b>	<b>80.0</b>	<b>606.0</b>

**FIGURE 4: FRANCE: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**



## KEY PROGRAMMES:

### Caesar 155mm MK1 Artillery Systems

In August 2022, the French Ministry of the Armed Forces signed a contract with Nexter for the procurement of 18 Caesar Mk1 artillery systems. The systems are being manufactured jointly by Nexter and the Direction Générale de l'Armement (DGA). In January 2023, France placed an order for 12 additional units which will be transferred to Ukraine. Interestingly, in response to the current war, Nexter has tripled the monthly production of the CEASAR howitzers, as compared to February 2022. The company can now manufacture four to six artillery systems a month, and this is expected to increase to eight by 2024. The Caesar MK1 is a 155mm 52-calibre self-propelled gun and one of the lightest platforms in its class. A total of US\$166 million is expected to be spent on these procurements over the forecast period with deliveries expected to be completed in 2024.

### Caesar 155mm MK2 Artillery Systems

In February 2022, the French DGA contracted Nexter to develop and procure a new generation of the Nexter SPH called the Caesar 6x6 Mark 2 New Generation (NG) or the Caesar 155mm MK2. The US\$650 million contract included development and testing till 2025 and follow-on procurement thereafter. According to company sources, in 2024, the DGA is expected to exercise one of two options: either to develop 109 completely new Caesar MK2 platforms or 33 new ones and upgrade 76 of the existing Caesar MK1s to the MK2 version. A total of US\$395 million is expected to be spent on this programme over the forecast period. Even though the new version has the same configuration of the artillery system, Nexter is adding a level 2 mine and ballistic armoured cabin, resistant to improvised explosive devices and small-calibre ammunition, a new 460 HP engine, a new automatic gearbox, a new chassis, and advanced fire control software.

### Larinae - Medium-Range, Remotely Operated Munition

In June 2023, the French defence innovation agency - Agence de l'Innovation de Défense (AID), awarded a contract to Nexter Arrowtech, EOS Technologie, and Traak, to produce a medium-range loitering munition, armed with an anti-tank warhead. Developed under the Larinae program, the system features an inverted gull wing design (EOS Technologie), an explosively formed penetrator (Nexter), and a Global Positioning System (GPS) denied navigation system

to make the loitering munition immune to jamming (Traak). It is expected to have a minimum range of 80km, and an endurance of three hours. It will also be integrated with an electro-optic (EO) system with target detection capabilities of 15 km in daylight and 3 km at night. First demonstrations of the newly developed loitering munition are expected to take place in 2024, with final deliveries expected to take place in 2024. The total programme value has been estimated at around US\$15 million.

### Colibri – Loitering Munition

The French Direction Générale de l'Armement (DGA) and the Agence de l'innovation de défense (AID) launched the Colibri project in May 2022 to develop an indigenous, low-cost loitering munition, for use by the country's armed forces. The system is expected to be able to detect and destroy personnel and soft-skinned vehicles at a range of up to 5 km, with an endurance of 30 minutes. Nexter's Dard has been selected as the preferred platform for this project, with a yet unnamed French unmanned aerial vehicle (UAV) manufacturer, expected to take part as well. It consists of a flying wing design that can be fitted with an approximately 500 g, controlled fragmentation warhead. The system can also be configured to fly without the warhead, in which case it can be used to conduct surveillance and reconnaissance missions only. The total programme value has been estimated at US\$15 million with final deliveries expected to take place in 2025.

# GERMANY



Germany is one of the most important markets for artillery systems in Europe, both in terms of procurement and production. The PzH2000 SPH, MARS GMLRS and RCH-155 manufactured by Krauss-Maffei Wegmann (KMW) and the HX3 10x10 tactical trucks artillery systems manufactured by Rheinmetall, are the most popular systems in the international market.

The major procurement programme for the Bundeswehr is the replacement of the Indirect Fire Support Medium Range Artillery system at a cost of around US\$1.8 billion. Other procurements include that of 155mm artillery ammunition from Rheinmetall for US\$1.3 billion, 28 PzH2000 SPHs

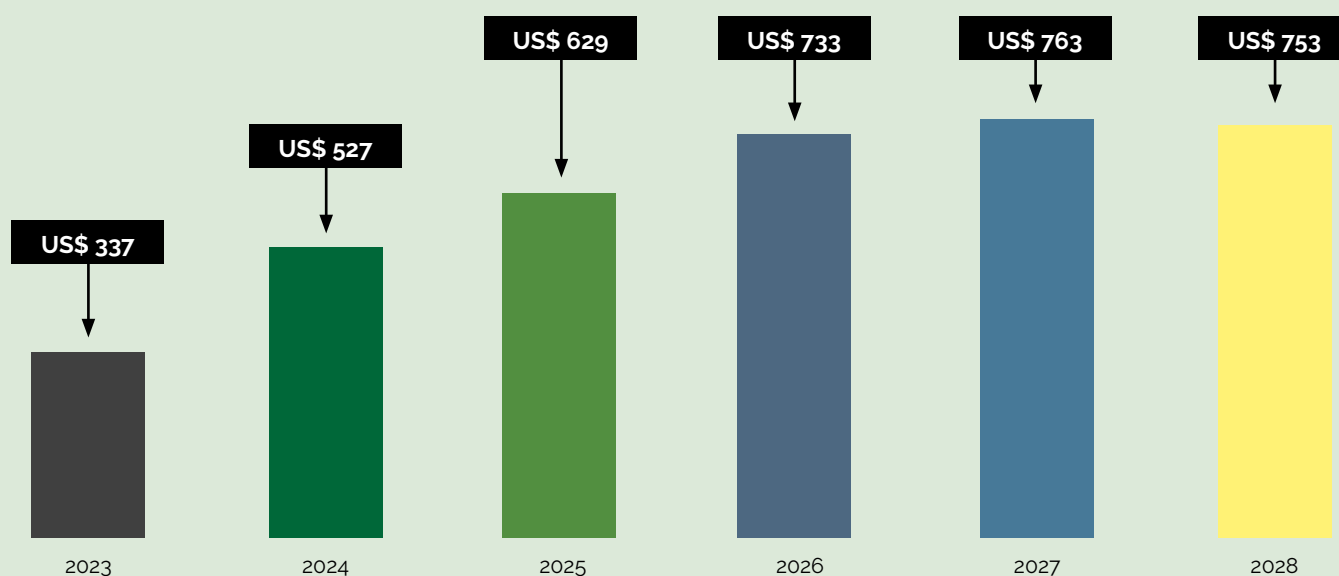
for around US\$560 million, DM121 high-explosive shells from Rheinmetall for US\$138 million, long-range loitering munitions from Israel Aerospace Industries (IAI) for US\$75 million, five ZUZANA-2 Wheeled Tank Howitzers for US\$31 million, and Precise and Universal Launching Systems (PULS) from Elbit Systems for US\$27 million.

The German artillery systems market is expected to increase from US\$337 million in 2023 to US\$753 million in 2028, at a CAGR of 17.4%. Gun/tube type artillery systems are the leading segment in Germany by far with a market value of US\$3.4 billion over the forecast period, followed by Rockets – US\$227 million, and loitering munitions – US\$75 million.

**TABLE 4: GERMANY: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**

Types	2023	2024	2025	2026	2027	2028	Total
Rockets	25.0	48.0	49.0	35.0	35.0	35.0	227.0
Rockets	25.0	48.0	49.0	35.0	35.0	35.0	227.0
Gun/tube type artillery	300.0	467.0	568.0	685.0	715.0	705.0	3,440.0
Loitering munitions	12.0	12.0	12.0	13.0	13.0	13.0	75.0
<b>Total</b>	<b>337.0</b>	<b>527.0</b>	<b>629.0</b>	<b>733.0</b>	<b>763.0</b>	<b>753.0</b>	<b>3,742.0</b>

**FIGURE 5: GERMANY: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**



## KEY PROGRAMMES:

### Indirect Fire Support Medium Range Artillery Replacement

The German army's main and most advanced artillery platform is the PzH 2000 155mm Self-Propelled Howitzer. The Bundeswehr currently has around 119 of these systems, out of which around 40 are estimated to be operational. Even though they are expected to remain in service for another 15 to 20 years, the government has already started looking for a wheeled replacement. According to an anonymous German defence official, this replacement is expected to be based on the Boxer platform, owing to it being readily available and the Government's desire to field the systems latest by 2029. Even though the terms of this deal haven't been disclosed, we estimate the procurement to cost around US\$1.8 billion, with approximately US\$1.5 million being spent over the period 2024-2028. In May 2023, Rheinmetall and Elbit test-fired a new 155mm wheeled howitzer system, which is designed to integrate the L60 gun in the future. The contract for the selected platform is expected to be awarded in 2024.

### Panzerhaubitze (PzH) 2000 155 mm Self-Propelled Howitzers (SPHs)

In March 2023, Germany's Federal Office of Bundeswehr Equipment, Information Technology, and In-Service Support, awarded a contract to domestic company Krauss-Maffei Wegmann (KMW) for 10 new Panzerhaubitze (PzH) 2000 155 mm self-propelled howitzers (SPHs). This includes an option for 18 additional systems that will be delivered in three batches of six each. The 10 systems worth US\$200 million are expected to be delivered latest by 2026. The option for the 18 additional ones is expected to trigger immediately after, with all SPHs being delivered by 2029, at a cost of around US\$360 million. The Panzerhaubitze 2000 howitzer can hit targets at a distance of 30 kilometres with standard ammunition and a distance of up to 100 kilometres with advanced ammunition.

### ZUZANA-2 Self-Propelled Wheeled Tank Howitzers

On October 2nd, 2022 Germany, Norway and Denmark announced their decision to jointly purchase 16 ZUZANA-2 self-propelled wheeled tank howitzers from Slovakia, to subsequently send to Ukraine. The deal has an estimated value of US\$90 million with the three countries sharing it equally. Production of the howitzers will start in Slovakia, with deliveries expected sometime in 2023-2024. These systems are in addition to the eight ZUZANA-2's already delivered to Ukraine by Slovakia, as part of a deal signed in June 2022.

### 155mm Artillery Ammunition and DM121 High-Explosive Shell

In July 2023, the German Bundeswehr, through the Federal Office for Bundeswehr Equipment, Information Technology and In-Service Support (BAAINBw), awarded two contracts to Rheinmetall for the supply of an unspecified number of 155mm artillery ammunition and DM121 high-explosive shells. The procurement of the artillery ammunition is expected to cost around US\$1.3 billion with deliveries culminating in 2029. The DM121 high-explosive shells will be delivered latest by 2026 at a total cost of US\$138 million.

### Unitary Guided Missiles for the Guided Multiple Launch Rocket System (GMLRS)

In July 2021, the Bundeswehr announced that it will procure 1,818 unitary guided missiles for its inventory of Guided Multiple Launch Rocket Systems (GMLRS) for around US\$239 million. Each GMLRS rocket is integrated into an MLRS launch pod and is launched from the HIMARS or M270 family of launchers. Currently, both GMLRS variants "Unitary and SMARt" are supported by the MARS II Fire Control System.

# LITHUANIA

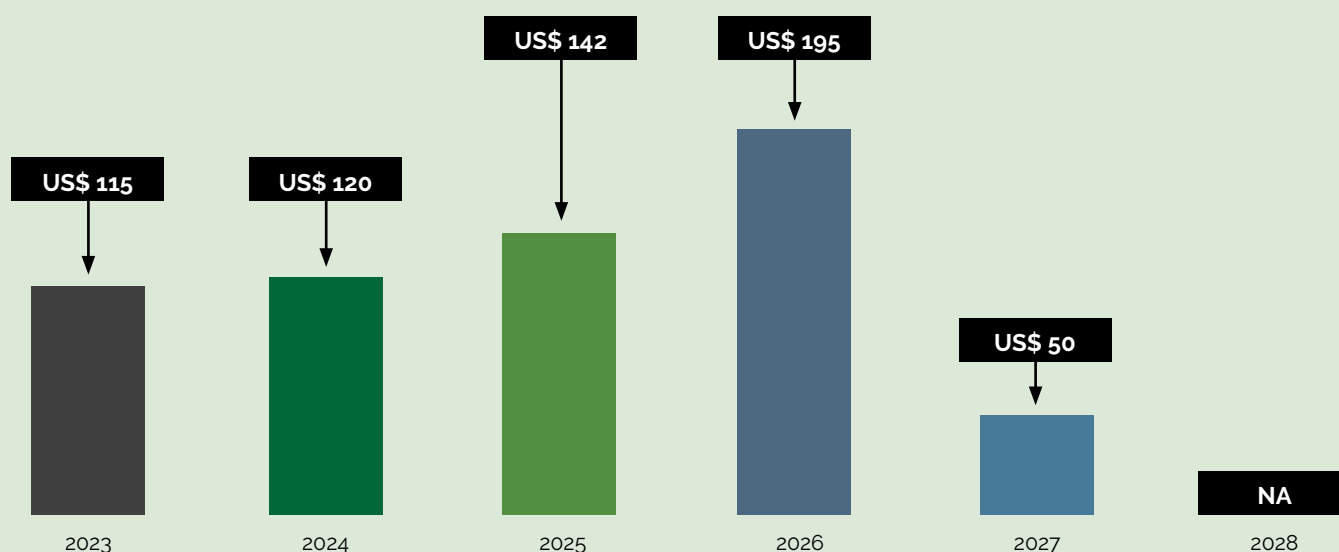


Lithuania is fast emerging as an important defence market in Europe as the government looks to boost national security in the wake of the declining security situation in the region. The country's artillery systems market is expected to cumulatively value US\$622 million over the forecast period. The programmes driving this expenditure include the procurement of 44 M142 HIMARS Artillery and M30A2 Guided Multiple Launch Rocket Systems (GMLRS) from Lockheed Martin Missiles and Fire Control for US\$495 million, 18 Caesar 155mm MK2 artillery systems from Nexter for US\$159 million, and Switchblade 600 drones from AeroVironment for US\$48 million.

**TABLE 5: LITHUANIA: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**

Types	2023	2024	2025	2026	2027	2028	Total
Rockets	85.0	90.0	100.0	140.0	-	-	415.0
Gun/tube type artillery	20.0	20.0	30.0	39.0	50.0	-	159.0
Loitering munitions	10.0	10.0	12.0	16.0	-	-	48.0
<b>Total</b>	<b>115.0</b>	<b>120.0</b>	<b>142.0</b>	<b>195.0</b>	<b>50.0</b>	<b>-</b>	<b>622.0</b>

**FIGURE 6: LITHUANIA: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**



## KEY PROGRAMMES:

### M142 HIMARS Artillery and M30A2 Guided Multiple Launch Rocket Systems (GMLRS)

In December 2022, Lithuania signed a contract with the U.S. government to procure as many as eight M142 High Mobility Artillery Rocket Systems. The US\$495 million programme includes the acquisition of 36 M30A2 Guided Multiple Launch Rocket System (GMLRS) Alternative Warhead (AW) Missile Pods with Insensitive Munitions Propulsion System (IMPS); 36 M31A2 GMLRS Unitary High Explosive (HE) Missile Pods; 36 XM403 Extended Range GMLRS-AW Missile Pods with IMPS; 36 XM404 Extended Range GMLRS Unitary Pods with IMPS; and 18 M57 Army Tactical Missile System (ATACMS) Missile Pods. Also, part of the deal are M28A2 Low Cost Reduced Range Practice Rocket (LCRRPR) pods; International Field Artillery Tactical Data System (IFATDS); battle management system Vehicle Integration Kits; ruggedised laptops; training equipment publications for HIMARS and munitions; and other related elements of programme and logistics support. Final deliveries are expected in 2026.

### Caesar 155mm MK2 Artillery Systems

Lithuania signed an agreement with France to acquire 18 Caesar Mark II self-propelled 155 mm howitzers manufactured by Nexter. This happened when Lithuania's Defence Minister Arvydas Anušauskas visited Paris on 29 December to meet French Defence Minister Sebastien Lecornu. The deal is expected to value US\$159 million, with all deliveries scheduled for completion by 2027. The Ceasars will replace Lithuania's ageing towed 105mm howitzers.

### Switchblade 600 Drones

In December 2022, the Lithuanian defence ministry signed a deal with the U.S. to procure an unspecified number of Switchblade 600 drones, manufactured by AeroVironment. These loitering munitions are redeployable systems that give the country's army the ability to destroy enemy tanks and other armoured vehicles at a distance of up to 40 kilometres. This US\$48 million deal makes Lithuania the first country outside the U.S. to procure these systems and paves the way for further defence collaboration between the two countries. Final deliveries are expected in 2026.

# NETHERLANDS

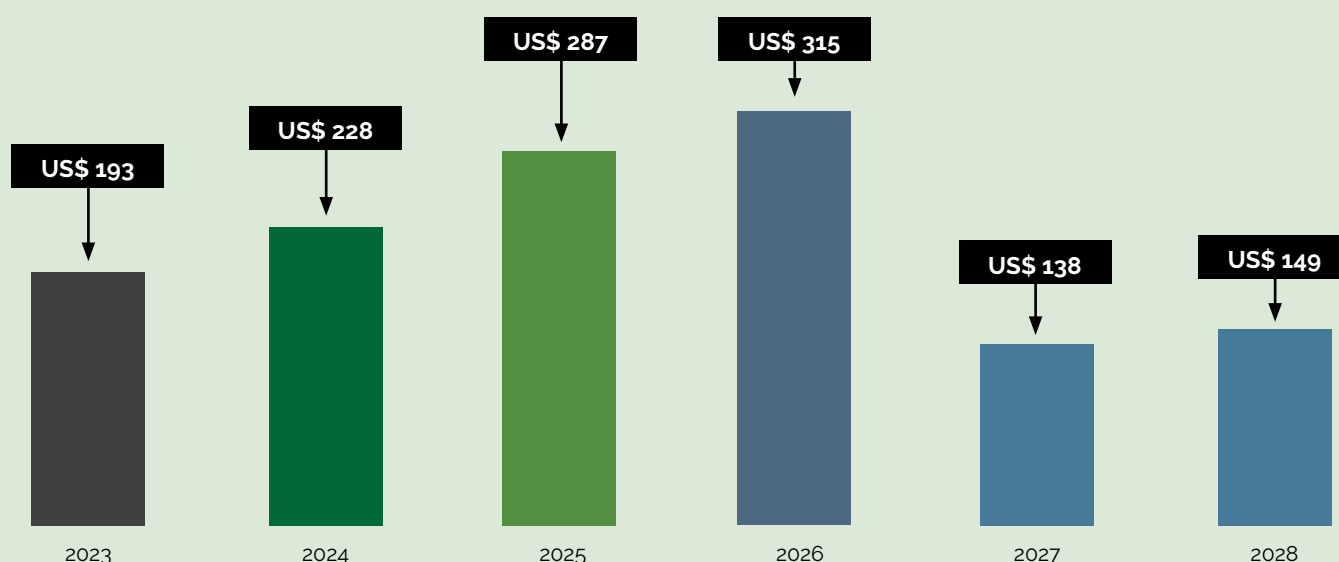


After many years of declining military spending, the Dutch military announced a sudden increase in capital spending over the next few years. This policy turnaround was triggered mainly by Russia's invasion of Ukraine and the resultant security threat in the region. The country's artillery market is expected to benefit from this with procurements including 20 PULS artillery systems for US\$305 million, precision guided artillery ammunitions for US\$300 million, and the prototype testing of PZH2000 self-propelled howitzer for US\$50 million. The Dutch market for artillery systems is expected to cumulatively value US\$1.3 billion over the forecast period.

**TABLE 6: NETHERLANDS: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**

Types	2023	2024	2025	2026	2027	2028	Total
Rockets	40.0	45.0	50.0	55.0	55.0	60.0	305.0
Gun/tube type artillery	150.0	180.0	193.0	215.0	33.0	34.0	805.0
Precision ammunition	-	-	40.0	45.0	50.0	55.0	190.0
Target acquisition technologies (AI)	3.0	3.0	4.0	-	-	-	10.0
<b>Total</b>	<b>193.0</b>	<b>228.0</b>	<b>287.0</b>	<b>315.0</b>	<b>138.0</b>	<b>149.0</b>	<b>1,310.0</b>

**FIGURE 7: NETHERLANDS: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**



## KEY PROGRAMMES:

### PZH2000 Self-Propelled Howitzer – Upgrade

In December 2020, Germany and the Netherlands entered into an agreement for a joint mid-life upgrade of their 155mm PzH 2000 howitzers. The objective of this project is to address component ageing and ensure the continued operational capability of the self-propelled howitzers until the 2040s.

The PzH 2000 is a 155mm self-propelled howitzer originally developed by Krauss-Maffei Wegmann (KMW) and Rheinmetall in the 1980s and 1990s for the German Army. The Netherlands procured around 57 units in 2002, out of which around 51 units are in inventory excluding eight units sent to Ukraine.

A prototype is currently under construction for both countries and is expected to be ready for testing by 2025. The Dutch fleet of howitzers is anticipated to undergo upgrades by the end of 2028, at an estimated budget of US\$50 million. The overhaul will encompass a new electronic architecture, an upgraded climate system and energy supply, as well as improvements in driver vision.

### PULS Artillery Rocket Systems

Elbit Systems was awarded a contract worth US\$305 million in May 2023 to supply the Precise & Universal Launching System (PULS) artillery rocket systems to the Royal Netherlands Army. This contract is part of a broader military cooperation agreement between the Israeli and Dutch defence ministries.

Under the terms of the contract, Elbit Systems will deliver 20 PULS artillery rocket systems integrated on a selected truck platform, along with rockets and missiles of various ranges. Additionally, it will also provide associated training and support services.

The PULS system is designed with an open architecture approach, enabling future expansion, integration with legacy C4i solutions, and customization to meet specific customer requirements. It offers a comprehensive and cost-effective

solution, supporting the firing of both free-flying rockets and precision-guided rockets and missiles, ranging from 12km to 300km.

The Netherlands Army is scheduled to receive the PULS artillery systems by 2028.

### Precision Guided Artillery Shells

As per the Defence Acquisition Plan unveiled in April 2023, the Netherlands Ministry of Defence has initiated a programme to procure additional ammunition worth approximately US\$1.64 billion. This ammunition includes missiles, rockets, precision-guided artillery shells, conventional artillery, and small arms ammunition. The objective of this plan is to replenish and restore the country's ammunition stocks by 2031.

It is estimated that approximately US\$300 million will be dedicated to the procurement of precision-guided artillery munitions by 2031, out of which around US\$190 million is projected to be spent between 2023 and 2028.

### AN/DAS-4 Multi-Spectral Targeting Systems

In June 2023, the Netherlands received approval from the U.S. State Department for a Foreign Military Sale (FMS) to acquire up to eight AN/DAS-4 Multi-Spectral Targeting Systems. This sale is part of a larger agreement that includes up to four MQ-9A Block 5 aircraft, three UAV MQ-9 Mobile Ground Control Systems (MGCS), and 20 Lynx AN/APY-8 Synthetic Aperture Radars.

Developed by Raytheon, the AN/DAS-4 Multi-Spectral Targeting System (MTS) is a sensor package combining electro-optical/infrared (EO/IR), laser designation, and laser illumination capabilities. It is designed to provide detailed intelligence data from both the visual and infrared spectrum, supporting various military, civilian, and allied missions worldwide. The Netherlands is estimated to allocate approximately US\$10 million for the procurement of these target acquisition technologies, with deliveries expected to be completed by 2025.



# NORWAY



The Norwegian market for artillery systems is expected to cumulatively value US\$568 million over the forecast period. The country's major programmes include the procurement of artillery ammunition (40/60/90 km) for the 155 self-propelled howitzers for US\$466 million, long range precision weapon systems for the Army for US\$233 million, five ZUZANA-2 self-propelled wheeled tank howitzers from Konstrukta Defence for US\$30 million, and four K9 Thunder 155mm systems from Hanwha Defense for US\$28 million.

**TABLE 7: NORWAY: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**

Types	2023	2024	2025	2026	2027	2028	Total
Rockets	-	-	-	50.0	55.0	60.0	165.0
Gun/tube type artillery	20.0	28.0	80.0	80.0	90.0	105.0	403.0
<b>Total</b>	<b>20.0</b>	<b>28.0</b>	<b>80.0</b>	<b>130.0</b>	<b>145.0</b>	<b>165.0</b>	<b>568.0</b>

**FIGURE 8: NORWAY: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**



## KEY PROGRAMMES:

### K9 Thunder 155mm

In November 2022, the Norwegian Defence Material Agency (NDMA) contracted South Korean defence manufacturer Hanwha Defense to procure four K9 self-propelled howitzers. This would take Norway's total number of K9s to 28. Even though the value of the deal wasn't disclosed, it is estimated to be around US\$28 million, with deliveries culminating in 2024. This acquisition is an extension of Norway's 2017 contract to procure 24 similar systems for around US\$215.2 million, deliveries for which were completed in 2021.

### Long Range Precision Weapon System

The Norwegian Army has outlined the procurement of a long-range precision weapon system as part of its future acquisitions strategy. Procurement is scheduled to take place between 2026-2028. While selecting the vendor, the government will ensure that the weapon system has a range exceeding that of existing army systems. The programme is expected to cost around US\$233 million with around US\$165 million being spent during the forecast period.

### Artillery Ammunition (40/60/90 km) for the 155 System

The Army has also requested a significant number of artillery ammunition for its K9 Thunder howitzers. The ammunition should be able to hit targets at distances of 40km, 60km and 90km. The total programme is expected to value US\$355 million, between 2025-2028. One such contract was signed in December 2022 with local company Nammo to supply the Armed Forces with 155mm NM269 artillery rounds for the next several years. These munitions have a range of over 40 kms.

### ZUZANA-2 Self-Propelled Wheeled Tank Howitzers

In October 2022, Norway, along with Germany and Denmark, decided to jointly procure 16 ZUZANA-2 self-propelled wheeled tank howitzers from Slovakian company Konstruktia Defence, to provide emergency support to Ukrainian forces. All three nations agreed to fund the US\$90 million procurement equally, with the production of these systems taking place in Dubnica nad Váhom near the Czech border. On August 1, 2023, the first two systems were delivered to Ukraine with all 16 expected to be delivered by 2024.

# POLAND

Poland is the largest market for artillery systems in Europe, as it ramps up weapons imports following Russia's invasion of Ukraine. Russia's 'special military operation' has heightened security fears among many former eastern block nations and Poland has responded to this by increasing its defence budget to 2.4% of GDP in 2022, further raising it to 3.9% in 2023, and has plans to increase it to 4.2% of GDP in 2024.

The Polish market is expected to increase from US\$2.0 billion in 2023 to as much as US\$3.1 billion in 2028 at a CAGR of 9.7%. This exponential growth is due to the procurement of 672 K9 howitzers and related systems from South Korea

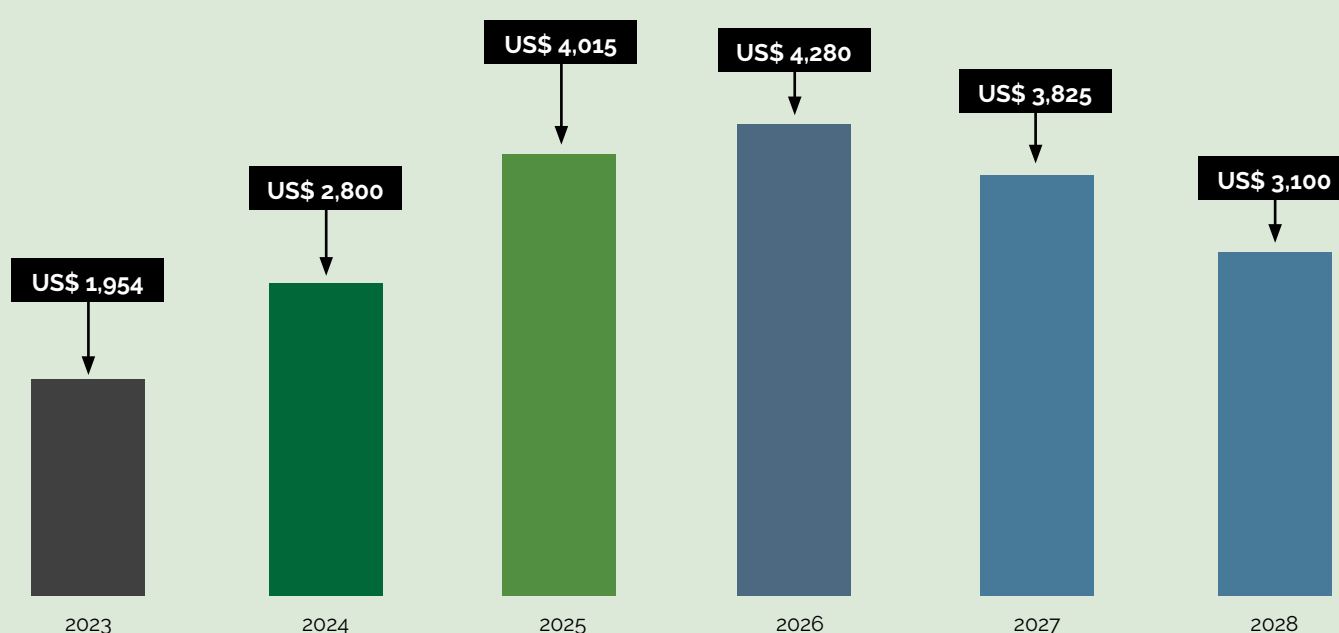
for US\$10.2 billion, 18 HIMARS and related systems from the U.S. for US\$10 billion and 288 K239 Chunmoo Rocket Launchers (WR-300 Homar programme) for US\$3.6 billion. Additionally, the country is procuring 48 Krab 155mm SPHs from local manufacturer Huta Stalowa Wola for US\$800 million.

Rockets is the largest segment in the Polish artillery market with a cumulative value of US\$10.3 billion over the forecast period followed by gun/tube type artillery – US\$9.7 billion. Cumulatively, the Polish artillery systems market is expected to value US\$20.0 billion over the period 2023-2028.

**TABLE 8: POLAND: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**

Types	2023	2024	2025	2026	2027	2028	Total
Rockets	1,200.0	1,400.0	1,700.0	1,950.0	2,000.0	2,000.0	<b>10,250.0</b>
Gun/tube type artillery	745.0	1,390.0	2,310.0	2,330.0	1,825.0	1,100.0	<b>9,700.0</b>
Loitering munitions	9.0	9.6	5.0	-	-	-	<b>23.6</b>
<b>Total</b>	<b>1,954.0</b>	<b>2,799.6</b>	<b>4,015.0</b>	<b>4,280.0</b>	<b>3,825.0</b>	<b>3,100.0</b>	<b>19,973.6</b>

**FIGURE 9: POLAND: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**



## KEY PROGRAMMES:

### K9 Howitzers

Poland is undertaking a programme to procure more than 650 units of 155 mm self-propelled howitzers (SPHs). On the 26th of August 2022, Poland signed a US\$2.4 billion contract with Hanwha Defense to procure around 212 K9 155mm SPHs including artillery rounds, training, and logistics support. Out of these, 48 are expected to be delivered as K9A1s built in the Republic of Korea Army configuration, while the remaining will be K9PLs, made to Polish specifications. Even though the K9PL is built on the K9A1 platform, it features improvements in automatic fire control, driver night vision periscopes, and auxiliary power units. The delivery of the former is expected to be completed in 2023 while that of the latter by 2026.

Further, in December 2023, Warsaw put forward a second order worth US\$2.6 billion for an additional 152 units that include six K9A1 and 146 K9PL variants. These SPHs are scheduled to be delivered between the years 2025 to 2027. It is estimated that Poland will spend around US\$10.2 billion to procure 672 K9 SPHs by 2029. A total of US\$8.9 billion will be spent during the forecast period.

### M142 High Mobility Artillery Rocket Systems (HIMARS) and other Equipment

In the wake of Russia's invasion of Ukraine, Eastern European nations are rushing to shore up their artillery inventories and the Lockheed Martin made HIMARS has emerged as one of the most popular systems worldwide. In January 2023, the U.S. State Department approved the sale of 18 HIMARS to Poland in a deal that could value as much as US\$10 billion. It will also include the procurement of 45 M57 Army Tactical Missile Systems (ATACMS), 532 XM403 Guided Multiple Launch Rocket System Extended Range Alternative Warheads (GMLRS-AW), 461 M30A2 GMLRS-AW pods and 521 M31A2 GMLRS Unitary weapons, each equipped with the Insensitive Munitions Propulsion System. Interestingly, the U.S. has barred Poland from transferring any of the ATACMS to Ukraine without prior approval.

### K239 Chunmoo Rocket Launchers (WR-300 Homar programme)

Poland contracted South Korean defence manufacturer Hanwha Defense to procure 288 K239 Chunmoo multiple rocket launchers, in October 2022. According to the agreement terms, the first batch of 18 systems are to be delivered to the Polish Army's 18th Mechanised Division, sometime in 2023, with final deliveries expected around 2028-2029. The US\$3.6 billion contract is a result of Lockheed Martin's inability to guarantee the delivery of 500 M142 High Mobility Artillery Rocket Systems (HIMARS), as per a previous letter of interest signed between the two countries in May 2021. Poland is now expected to integrate both the Chunmoo and HIMARS systems into its armed forces. In addition to the launchers, the deal also includes an undisclosed number of precision strike missiles (70 kms) and tactical missiles (300 kms).

### Krab 155mm Self-Propelled Howitzers

In September 2022, Poland awarded a contract to indigenous defence manufacturer Huta Stalowa Wola, for the development and acquisition of 48 Krab 155mm self-propelled howitzers and associated equipment. The US\$800 million deal also includes 22 command vehicles, 12 ammunition support vehicles, and two mobile workshops for weapons repair. All systems are expected to be delivered between 2025 and 2027.

# ROMANIA

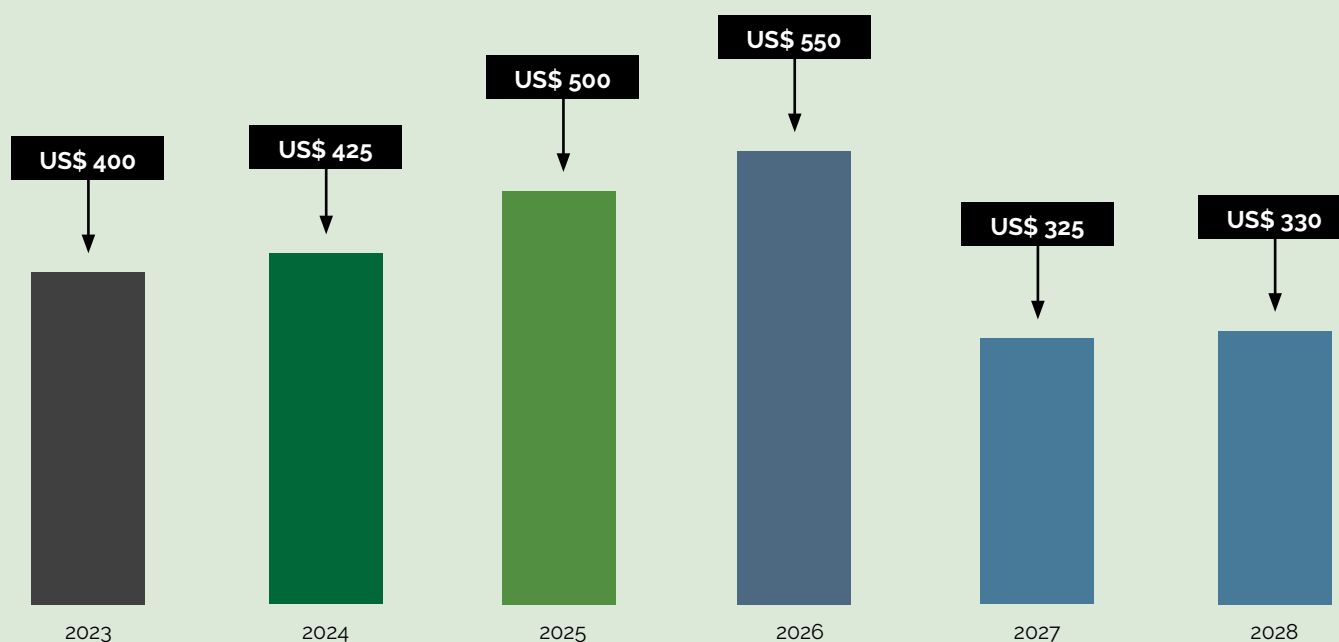


According to Thierry Breton, Commissioner at the European Commission's Internal Market, Romania is starting to play a larger role in the European defence market, both in terms of local production and foreign procurements. The country's artillery systems market is expected to cumulatively value US\$2.5 billion over the forecast period. The two programmes driving the market over the forecast period include the acquisition of 90 155mm Self-Propelled Howitzers (SPHs) from a yet unnamed supplier for around US\$2.2 billion, and 18 HIMARS systems from Lockheed Martin for US\$1.5 billion.

**TABLE 9: ROMANIA: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**

Types	2023	2024	2025	2026	2027	2028	Total
Rockets	125.0	150.0	200.0	225.0	-	-	<b>700.0</b>
Gun/tube type artillery	275.0	275.0	300.0	325.0	325.0	330.0	<b>1,830.0</b>
<b>Total</b>	<b>400.0</b>	<b>425.0</b>	<b>500.0</b>	<b>550.0</b>	<b>325.0</b>	<b>330.0</b>	<b>2,530.0</b>

**FIGURE 10: ROMANIA: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**



## KEY PROGRAMMES:

### HIMARS

In 2018, the Romanian defence ministry purchased 18 High Mobility Artillery Rocket Systems (HIMARS) from the U.S. for US\$1.5 billion, making it the first European country to purchase this system. The systems are expected to be deployed at the 81st Tactical Operational Missile Battalion stationed in Focsani, in eastern Romania. This programme will not only result in an indirect fire support capability for Romania's armed forces but also boost the country's strategic cooperation with the US by fulfilling its commitments within NATO. Final deliveries are expected in 2026. Out of a total of US\$1.5 billion, around US\$700 million are expected to be spent over the period 2023-2026.

### 155mm Self-Propelled Howitzers

In July 2023, it was reported that Romania intended to acquire 90 155mm self-propelled howitzers to equip its five self-propelled artillery battalions, each with 18 artillery systems. The programme is expected to be implemented across two stages with the first including the delivery of equipment for three battalions (54 howitzers) at a cost of around US\$1.3 billion. A formal proposal for this procurement was also submitted to the Romanian parliament in June 2023. Even though the supplier hasn't been finalised yet, the country's media and industry experts are leaning towards the K9A1 self-propelled howitzer manufactured by Hanwha Defense. The PzH2000 manufactured by German company Krauss-Maffei Wegmann/Rheinmetall and the Archer manufactured by BAE Systems are also in the running. Further, Romanian company Compania Nationala Romarm is also expected to play a role in this programme by providing related weaponry and ammunition. The total programme value is US\$2.2 billion, with around US\$1.8 billion expected to be spent over the forecast period.

# SWEDEN

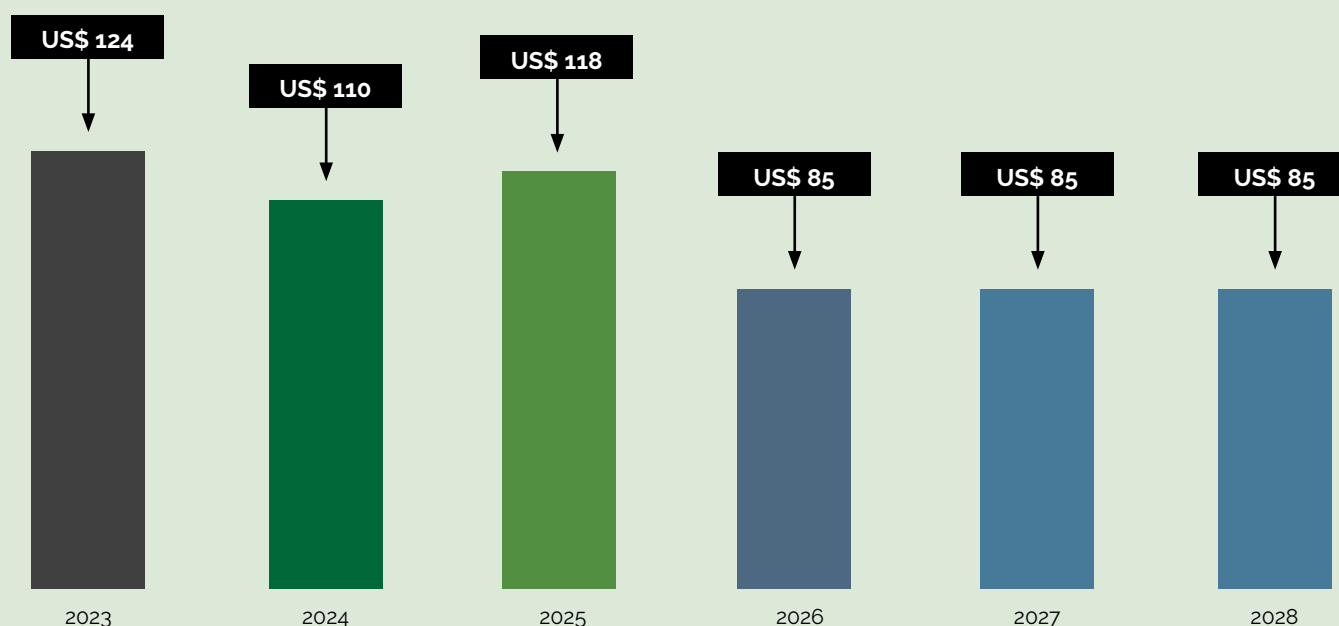


The Swedish market for artillery systems is expected to cumulatively value US\$607 million over the forecast period. The key programmes include the procurement of 72 Archer Truck-Mounted Howitzer Systems from BAE Systems for US\$555 million, eight sea-mobile artillery vessels for US\$120 million, and artillery ammunitions for US\$46.9 million.

**TABLE 10: SWEDEN: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**

Types	2023	2024	2025	2026	2027	2028	Total
Gun/tube type artillery	124.0	110.0	118.0	85.0	85.0	85.0	607.0
<b>Total</b>	<b>124.0</b>	<b>110.0</b>	<b>118.0</b>	<b>85.0</b>	<b>85.0</b>	<b>85.0</b>	<b>607.0</b>

**FIGURE 11: SWEDEN: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**



## KEY PROGRAMMES:

### Archer Truck-Mounted Howitzer Systems

On 15th June 2022, The Swedish Defence Materiel Administration (FMV) and BAE Systems Bofors signed a letter of intent (LOI) to procure 24 Archer self-propelled howitzers (SPHs). The LOI, signed at the Eurosatory 2022 defence exhibition in Paris, was in line with the Swedish Total Defence Strategy 2021-25, which mandated the establishment of an additional artillery battalion. The country already has 48 of these systems with the first being integrated into service in September 2015. The Archer SPHs were previously mounted on a Volvo A30 6x6 articulated hauler. However, the new ones will be mounted on a Rheinmetall MAN Military (RMMV) HX2 8x8 vehicle, owing to the platform's faster on-road mobility. According to company sources, the howitzer has a range of over 31 miles with conventional artillery rounds and 37 miles with precision-guided munitions including the Excalibur. The deal is valued at around US\$108 million with deliveries expected to be completed by 2025. Then in September 2023, Sweden placed an order for 48 additional Archer SPHs for around US\$447 million. The delivery period for this new order is 2025-2029.

## KEY PROGRAMMES:

### Artillery Ammunition:

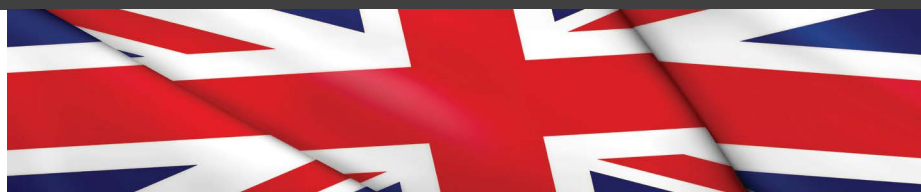
In September 2022, Sweden ordered artillery ammunition worth US\$46.86m to be supplied to Ukraine. This procurement was in response to Ukrainian Foreign Minister Dmytro Kuleba's request to provide the country with weapons, including howitzers and shells. According to the Swedish counterpart Ann Linde, this aid was the seventh such package to support Ukraine's resistance against Russia. Additionally, she said that Sweden was also contemplating providing Ukraine with the Archer artillery system, the RBS70 air defence system, and other equipment. Deliveries are expected to finish towards the end of 2023.

### Sea-Mobile Artillery Vessels

In May 2023, the Swedish Defence Materiel Administration (FMV) awarded a contract to domestic company Swede Ship Marine, to procure eight naval artillery platforms. This US\$120 million programme is expected to give the country's amphibious forces in Stockholm and Gothenburg the ability to conduct indirect fires from the sea. Furthermore, the vessels' sensors and weapon systems will have the ability to be configured to direct fire for self-protection. The procurement will also include stabilised hand-held grenade launchers, associated training, and spare parts. Deliveries of the training systems are expected to take place between 2026 to 2027, followed by the platforms from 2027 to 2028. This acquisition is part of the country's broader Amphibious Battalion 2030 programme which is currently in the preparation and research phase. It is expected to witness additional procurements during the period 2024-2030.



# UK

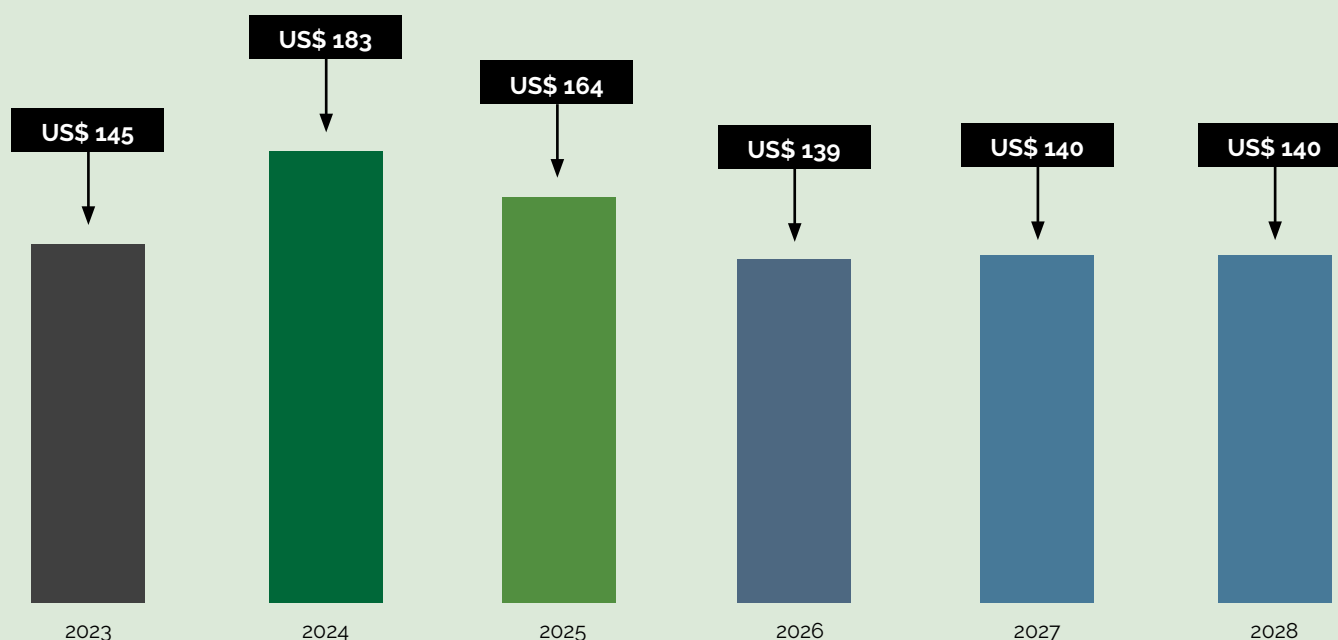


The UK's market for artillery systems is expected to cumulatively value US\$910.9 million over the forecast period. The country's major programmes include the procurement of heavy artillery rounds under the Next-Generation Munitions Solution (NGMS) programme for US\$640 million, the Mobile Fires Platform programme to procure 116 SPH for US\$430 million and the procurement of 31 MLRS for US\$220 million, procurement of target acquisition technologies under Dismounted Joint Fires Integrators programme for US\$137 million, and loitering munitions from AeroVironment for US\$44.9 million.

**TABLE 11: UK: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**

Types	2023	2024	2025	2026	2027	2028	Total
Rockets	35.0	40.0	44.0	49.0	40.0	40.0	248.0
Gun/tube type artillery	70.0	113.0	85.0	90.0	100.0	100.0	558.0
Loitering munitions	14.9	-	-	-	-	-	14.9
Target acquisition technologies (AI)	25.0	30.0	35.0	-	-	-	90.0
<b>Total</b>	<b>144.9</b>	<b>183.0</b>	<b>164.0</b>	<b>139.0</b>	<b>140.0</b>	<b>140.0</b>	<b>910.9</b>

**FIGURE 12: UK: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**



## KEY PROGRAMMES:

### Mobile Fires Platform (MFP)

The UK MoD plans to acquire 116 self-propelled howitzers (SPHs) as part of the Mobile Fires Platform (MFP) programme. The new SPHs will replace the Army's ageing AS90 howitzers that have been in service for the past 30 years. US\$1 billion (GBP800 million) was set aside for the programme by the British government in 2021.

For the project, Hanwa Defense in South Korea and Lockheed Martin UK are jointly bidding to develop and supply the newest variant of the K9 self-propelled howitzers. Other companies such as Nexter Systems with its Cesar platform, Rheinmetall with a howitzer variant of its eight-wheel drive Boxer armoured personnel carrier, and BAE Systems with its Archer truck-mounted system, have also expressed their interest in meeting the MFP programme requirements.

In December 2023, BAE Systems, Babcock, and Rheinmetall BAE Systems Land formed an alliance to offer the Archer wheeled mobile artillery system as a candidate for the MFP programme. However, this coalition faces major challenges, with the primary one being the lack of a local barrel manufacturer.

Initially, the MFP was expected to have a capability of 116 guns by 2032, with 18 guns available by early 2029. However, after Russia's invasion of Ukraine, the UK MoD was forced to accelerate the acquisition process for SPHs and not wait until 2030 to take delivery.

### Mobile Fires Platform (MFP) – Interim Capability

Even though the UK's MFP programme has reached the advanced stage with a contract expected to be awarded shortly, the poor state of the British Army's 155 mm artillery capability, has mandated the acquisition of an interim capability. The UK Army is expected to acquire between six and eight BAE Systems Bofors Archer 155mm self-propelled artillery systems to cover a capability gap caused by donating AS90 howitzers to Ukraine. On 16th March 2023, Defence Equipment & Support (DE&S) announced that 14 artillery systems would be transferred to the UK later that month and the systems would become operational with the Army in April 2024. This procurement is expected to cost around US\$83 million.

### M270 MLRS

Currently, the UK MoD is upgrading its fleet of M270 Multiple Launch Rocket Systems (MLRS) to the M270A2 configuration. As part of its Joint Future Effects Capability programme, the army plans to upgrade and double its fleet of around 40 M270s for future missions.

MLRS launchers consist of two six-rocket pods and an M270 launcher loaded with 12 rockets. The launcher, which is mounted on a stretched Bradley chassis, is a self-loading and self-aiming system.

In early 2022, US\$32 million was allocated for the upgrade of nine M270 MLRS launchers to the A2 configuration by 2026. Lockheed Martin, the original manufacturer of both variants, has agreed to assist the UK with the upgrade process. The MoD expects to spend about US\$220 million to procure 31 additional MLRS systems by 2027-2028.

### Heavy Artillery Rounds:

In November 2020, BAE Systems was awarded a US\$3.2 billion contract to supply munitions for the British armed forces for 15 years starting in 2023 under the Next Generation Munitions Solution (NGMS) programme. The contract replaces the US\$2.4 billion, 15-year Munitions Acquisition, Supply Solution (MASS) contract that started in 2008. BAE Systems will manufacture 39 types of munitions for the Royal Navy, Army, Royal Air Force, and Strategic Command to use on the front line, including small arms ammunition, mortars, medium-calibre gun rounds, and large-calibre artillery and tank shells. Each year, BAE will produce approximately 70 million rounds of small-arms ammunition, 100,000 large-calibre rounds, 40,000 medium-caliber shells, and 75,000 mortar rounds. According to estimates, the MoD will procure artillery munitions worth US\$640 million between 2023 and 2037.

### Dismounted Joint Fires Integrators ("D-JFI")

In January 2021, Elbit Systems UK was awarded a US\$137 million contract to provide future target acquisition solutions for the country's armed forces. Part of the broader Dismounted Joint Fires Integration (D-JFI) programme, this acquisition is part of a series of deals for Elbit in the UK, which has shown interest in Israeli technology. According to Elbit Systems, "The D-JFI solution is a networked, passive and active target acquisition solution that acquires, generates and communicates target information to effector systems for effective engagement of joint precision and non-precision fires." Final deliveries are expected to be made in 2025.

# INDIA



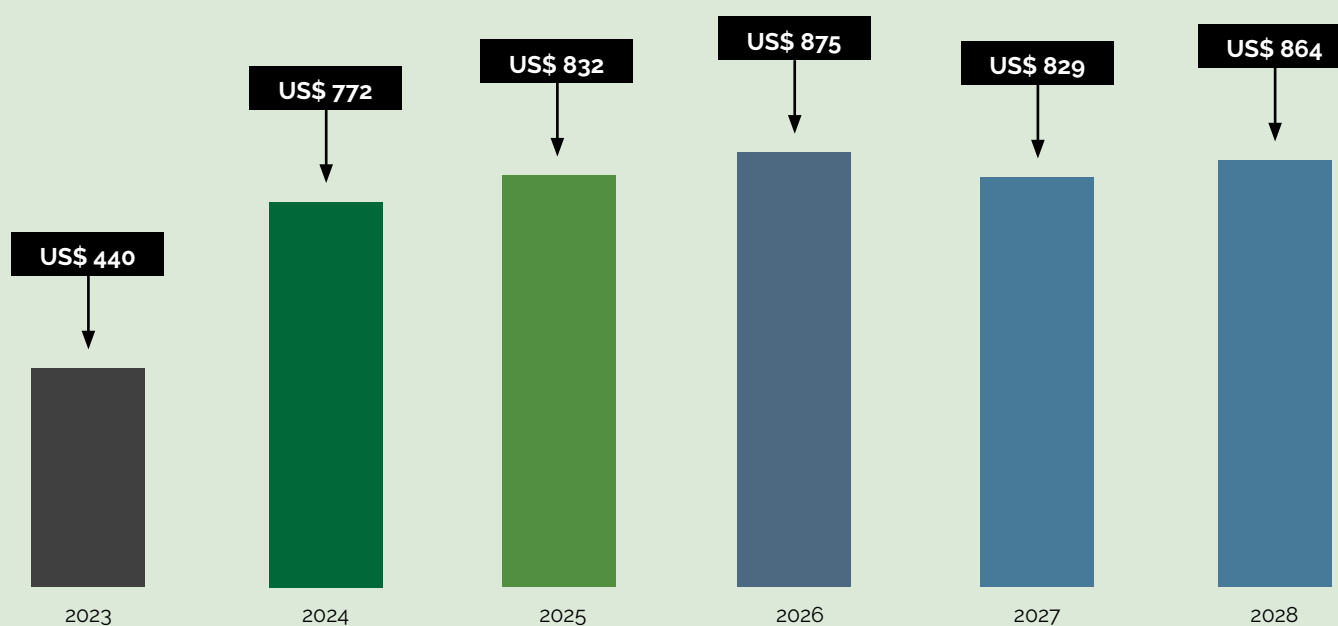
India is one of the biggest markets for artillery systems in the Asia-Pacific region, with most of the manufacturing taking place indigenously by companies such as Bharat Forge, Tata Advanced Systems, Ordnance Factories Board (OFB), Kalyani Group, L&T, and Solar Industries. The only foreign participation over the forecast period is by South Korean manufacturer Hanwha Defense who is making the Kg Vajra-T howitzers in collaboration with L&T.

Key programmes include the procurement of Kg Vajra self-propelled howitzers (SPHs) for US\$1.4 billion, Advanced Towed Artillery Gun Systems (ATAGS) for US\$1 billion, 155mm Towed Artillery Gun Systems (TAGS) for US\$780 million, Sharang towed artillery systems upgrade for US\$726 million, Indigenously Designed, Developed, and Manufactured (IDDM) mounted howitzers for US\$360 million, Dhanush 155-millimeter/45-caliber towed howitzers for US\$228 million, and Terminally Guided Munition (TGM) for US\$192 million. Cumulatively, the market is expected to value US\$4.6 billion between 2023 and 2028.

**TABLE 12: INDIA: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**

Types	2023	2024	2025	2026	2027	2028	Total
Gun/tube type artillery	365.0	665.0	730.0	765.0	770.0	806.0	<b>4,101.0</b>
Precision ammunition	35.0	65.0	75.0	82.0	44.0	45.0	<b>346.0</b>
Loitering munitions	39.6	42.0	27.0	28.0	15.0	13.0	<b>164.6</b>
<b>Total</b>	<b>439.6</b>	<b>772.0</b>	<b>832.0</b>	<b>875.0</b>	<b>829.0</b>	<b>864.0</b>	<b>4,611.6</b>

**FIGURE 13: INDIA: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**



## KEY PROGRAMMES:

### Advanced Towed Artillery Gun Systems (ATAGS)

The Indian Ministry of Defence (MoD) is currently examining a proposal put forth by the Indian Army to procure 307 Advanced Towed Artillery Gun Systems (ATAGS) for deployment along the borders with China and Pakistan.

The ATAGS project is an indigenous initiative undertaken by the Defence Research and Development Organisation (DRDO) as part of the Indian Army's artillery modernization programme. This towed artillery gun system comprises a barrel, breech mechanism, muzzle brake, and recoil mechanism, enabling it to discharge 155mm calibre ammunition with a firing range of 48 km. It incorporates an all-electric drive to ensure reliability and minimal maintenance over an extended period. Notably, the ATAGS is two tons lighter than comparable guns in its category, designed to offer improved accuracy, range, and the ability to fire five successive rounds in a short duration.

The DRDO has shared the technological expertise of the howitzer with Tata and Bharat Forge, two private firms that will manufacture the system once the order is finalised. Trials for the 155mm/52 calibre ATAGS howitzers were successfully conducted at the Pokhran Field Firing Range (PFFR) between April 26 and May 2, 2022.

It is anticipated that a formal contract will be signed in 2024, with the Indian MoD allocating approximately US\$1 billion to acquire the towed systems by 2028.

### Kg Vajra-T

In response to Chinese aggression along the Line of Actual Control (LAC), the Indian Army placed an order in February 2023 for 100 Kg Vajra Tracked Self-Propelled Howitzers (SPH) with Hanwha Defense, with production expected to take place in collaboration with domestic manufacturer Larsen and Toubro (L&T). Deliveries for all units are expected to be completed by 2028. According to a statement released by the Ministry of Defence (MoD), these SPHs will be deployed at the country's northern borders.

Currently, the Indian Army already possesses 100 of these systems which were delivered between 2019-2021. The Kg Vajra-Ts are equipped with a 155mm/52 Caliber cannon capable of firing shells at high elevation angles to engage distant targets. Even though they were initially designed for desert operations, the ongoing conflicts with China and Pakistan have resulted in their successful deployment in the mountainous regions as well.

The Indian MoD is planning to order an additional 100 units in 2024, with deliveries culminating by 2031. Overall, this programme is expected to witness total spending of around US\$1.4 billion, with US\$1.1 billion expected to be spent during the forecast period.

### Dhanush 155-millimeter/45-caliber Towed Howitzers

In February 2019, the Ordnance Factories Board (OFB), a state-owned defence equipment manufacturer, was awarded a contract by the Indian Army to produce 114 Dhanush 155-millimeter/45-caliber towed howitzers.

The Dhanush howitzer is an upgraded version of the FH-77B 155-millimeter/39-caliber towed howitzer, which was originally manufactured by the Swedish defence contractor Bofors (now BAE Systems). India had acquired 414 Bofors howitzers between 1987 and 1991. The Dhanush howitzer is based on the schematics provided by Bofors/BAE Systems under a technology transfer agreement signed in the late 1980s. It is a reverse-engineered and improved variant of the original Bofors design.

The Indian Army is expected to allocate approximately US\$228 million for the Dhanush howitzer programme, with around US\$115 million of that amount expected to be spent between 2023 and 2028. The Ordnance Factories Board is anticipated to complete the delivery of all 114 howitzers by 2026.

### Terminally Guided Munition (TGM)

In February 2023, the Ministry of Defence (MoD) of India shortlisted five domestic ammunition manufacturers to supply approximately two thousand 155mm terminally guided munitions (TGMs) for the Army's existing 39/45/52 calibre artillery guns. These include state-run Munitions India Ltd, as well as private sector companies such as Adani Defence Systems and Technologies Ltd (ADSTL), Bharat Forge Ltd, Economic Explosive Ltd, Premier Explosives, and SMPP Ltd. These companies were issued Project Sanction Orders (PSOs) by the Army under the national Make-II procurement scheme, which supports industry-funded projects.

Once the prototypes undergo testing, the Army intends to award contracts to two companies to supply approximately two thousand 155mm TGM projectiles, at a rate of 197 TGM per year. The entire programme is estimated to cost around US\$194 million, and formal contracts are expected to be finalised in mid-2024. The indigenously developed 155mm TGM is anticipated to cost roughly half the price of Russian and one-third of American systems. The ammunition deliveries are projected to be completed by 2028.

### Loitering Munitions and Launchers:

In November 2022, the Indian Army initiated a fast-track procurement process by issuing a request for proposal (RFP) to acquire 10 all-weather loitering ammunition launchers and 120 loitering munitions. These systems will be deployed in high-altitude and desert regions along the borders with China and Pakistan. The loitering ammunition launchers, referred to as the 'Aerial Targeting System (Extended Range)', are expected to possess a two-hour endurance and the ability to manoeuvre at a minimum altitude of 300 meters. Furthermore, these launchers will be capable of firing from an altitude of 4000 meters or higher and have the capacity to engage targets from any direction.

The loitering munitions are expected to be equipped with either a high explosive pre-fragmented (HEPF) or an anti-armour warhead, with a minimum weight of 8 kilograms. The estimated budget allocated by the Army for this programme is around US\$60 million. The deliveries of the loitering ammunition launchers and munitions are scheduled to be completed by 2028.

#### Canister Launched Anti-Armour Loiter Ammunition (CALM) systems

In November 2022, the Indian Army launched a fast-track procurement process by issuing a request for information (RFI) for the acquisition of 180 canister-launched anti-armour loiter ammunition (CALM) systems.

The CALM system consists of pre-loaded loiter ammunition canisters or drones, that once launched, can remain airborne over a designated area. After the target is identified, the CALM system can be guided to destroy the target using an explosive payload. As per the operational requirements outlined in the RFP, these accessories will provide mechanised infantry and armoured units with the capability to conduct remote-controlled or unmanned actions at distances of up to 15 km.

The procurement of CALM systems is expected to enhance India's border surveillance efforts, particularly considering ongoing tensions along its northern border and increasing incidents of arms being transported across the border via drones. A formal contract worth around US\$20 million for the CALM systems is expected to be awarded in 2024, with deliveries culminating by 2027.

#### Sharang - Upgrade

In August 2023, Advanced Weapons and Equipment India Limited (AWEIL), a state-owned defence equipment manufacturer, was awarded a US\$726 million contract to modernise the Sharang towed artillery guns. Under the Sharang upgrade programme, the existing Soviet-era 130mm M46 towed artillery pieces will be upgraded to 155mm/45-caliber models. The upgrade, which will be completed by 2028, is expected to enhance the gun's range from 27km to over 36km.

#### 155mm 52 calibre Towed Artillery Gun Systems (TAGS)

In September 2023, the Indian Ministry of Defence (MoD) received a proposal from the Army requesting the procurement of 400 towed artillery gun systems (TAGS). The Army intends to acquire these systems exclusively from Indian firms that promote the development of indigenous weapon systems. This acquisition will be in addition to the previously issued tender for the purchase of 307 Advanced Towed Artillery Gun Systems (ATAGS) to meet border requirements with China and Pakistan.

The Army's primary objective for the TAGS is to have lighter-weight and more easily deployable systems, especially in high-altitude regions similar to the older Bofors guns. The procurement process aligns with the Army's plan for "mediumization", focusing on indigenous guns, and is anticipated to be completed by the year 2042.

The MoD is expected to finalise a formal contract in 2024 and allocate approximately US\$780 million by 2028 for the procurement of the TAGS.

#### Nagastra-1

In April 2023, the Indian Army signed a contract with Solar Industries, a domestic defence manufacturer, to acquire 450 loitering munitions. Solar Industries secured the US\$25 million contract, surpassing competition from Polish and Israeli firms.

The loitering munitions, known as Nagastra-1 kamikaze, are equipped with a day/night camera for surveillance missions and a fragmentation warhead designed to neutralise "soft-skin" targets. These munitions have a man-in-the-loop range of 15 kilometres and an autonomous range of 30 kilometres. With GPS guidance, they can accurately strike a target with a precision of 2 meters and sustain flight for up to 60 minutes. In case of mission cancellation, the platform can be recalled and safely landed using a parachute recovery mechanism for subsequent use.

Given that the contract was signed under emergency provisions, it is anticipated that the Indian Army will receive all 450 loitering munitions by 2024.

# INDONESIA

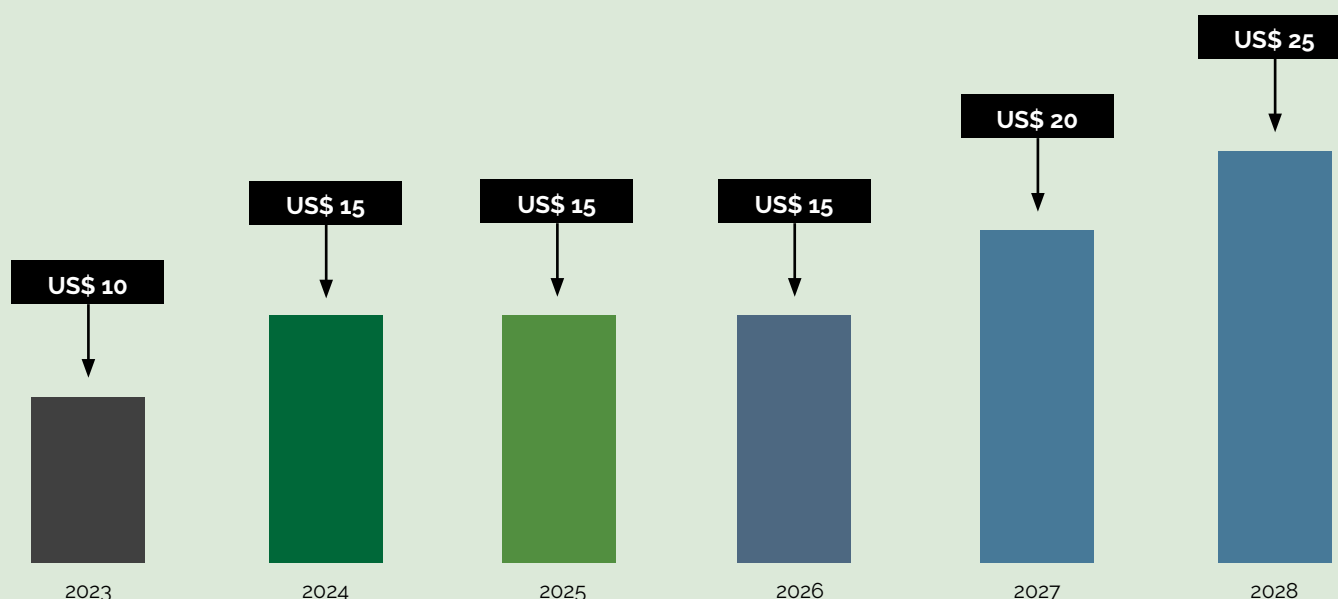


For the last few years, the Indonesian military has faced a financial squeeze, induced mainly by the COVID-19 pandemic. However, the country's decision to increase defence spending by 20% in 2023 shows its intent to build up its armed forces over the medium to long term. This is mainly to guard against potential tensions in the region, including the ones with China in the South China Sea. The only artillery programme over the period 2023-2028 is the indigenous development of the R-Han 122B - 122 mm Multiple Launch Rocket Systems (MLRS) by PT Pindad for US\$100 million.

**TABLE 13: INDONESIA: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**

Types	2023	2024	2025	2026	2027	2028	Total
Rockets	10.0	15.0	15.0	15.0	20.0	25.0	100.0
<b>Total</b>	<b>10.0</b>	<b>15.0</b>	<b>15.0</b>	<b>15.0</b>	<b>20.0</b>	<b>25.0</b>	<b>100.0</b>

**FIGURE 14: INDONESIA: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**



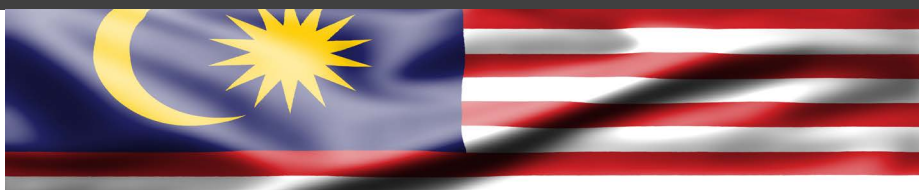
## KEY PROGRAMMES:

### R-Han 122B - 122 mm Multiple Launch Rocket System (MLRS)

In 2019, the Indonesian Ministry of Defence (MoD) initiated a programme to develop an enhanced version of the existing R-Han 122 multiple-launch rocket system (MLRS). This upgraded variant, known as the R-Han 122B, is the outcome of a collaborative endeavour involving several key stakeholders in the Indonesian defence industry. PT Dirgantara Indonesia (PT DI or IAe), the Ministry of Research and Technology, PT Dahana, and Pindad joined forces with the Indonesian Armed Forces to upgrade this rocket system.

By October 2023, Indonesian domestic defence manufacturer PT Pindad completed the development and testing of the R-Han 122B MLRS. The MLRS boasts a maximum speed of 3,614 km per hour and a maximum range of 32 km. The MoD is presently in the process of finalizing contracts for the procurement of R-Han 122B systems. The Indonesian MoD is projected to allocate approximately US\$100 million to this procurement programme between 2023 and 2028.

# MALAYSIA

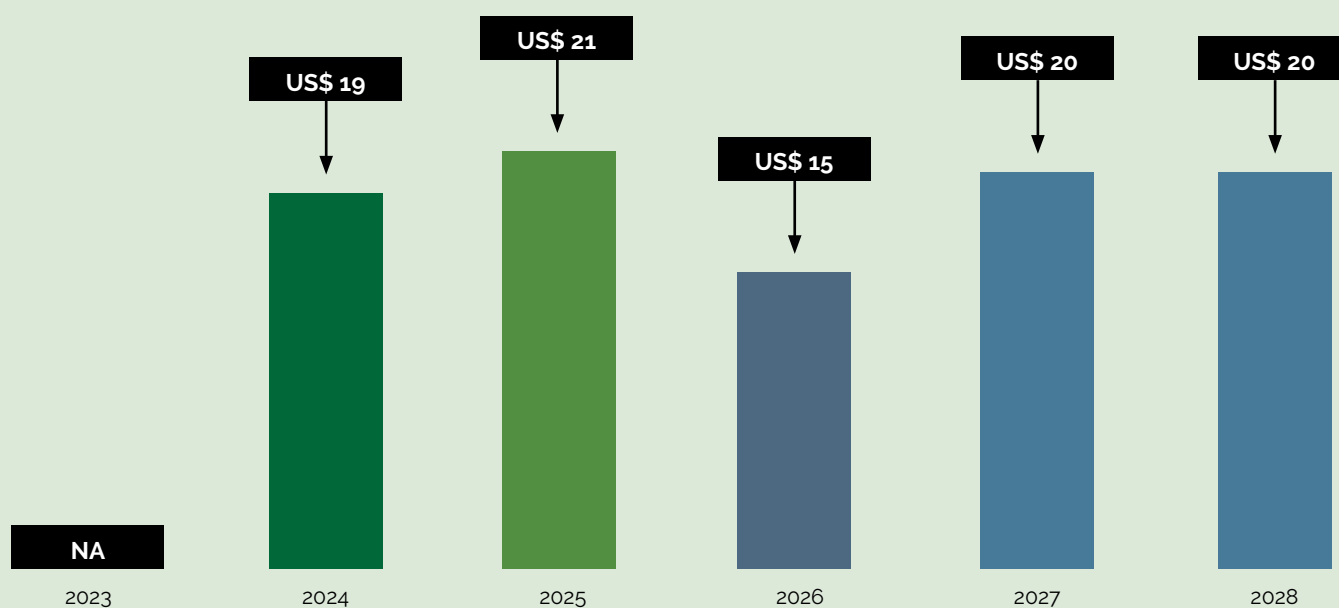


Malaysia, situated in a relatively peaceful region, has traditionally placed less emphasis on defence spending in comparison to other sectors such as healthcare and education. However, the government has now changed this stance to fill various capability gaps caused by years of neglect. As a result, the Malaysian defence budget in 2023 witnessed an increase of 10% as compared to the previous year to value almost US\$4 billion. The key artillery programmes in the country include the proposed procurement of 155mm self-propelled howitzers for US\$85 million and the Kargu loitering munition system from Turkish manufacturer Savunma Teknolojileri Mühendislik ve Ticaret A.Ş (STM) for US\$10 million. The Malaysian market for artillery systems is expected to cumulatively value US\$95 million over the forecast period.

**TABLE 14: MALAYSIA: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**

Types	2023	2024	2025	2026	2027	2028	Total
Gun/tube type artillery	-	15.0	15.0	15.0	20.0	20.0	<b>85.0</b>
Loitering munitions	-	4.0	6.0	-	-	-	<b>10.0</b>
<b>Total</b>	-	<b>19.0</b>	<b>21.0</b>	<b>15.0</b>	<b>20.0</b>	<b>20.0</b>	<b>95.0</b>

**FIGURE 15: MALAYSIA: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**



## KEY PROGRAMMES:

### 155mm Self-Propelled Howitzers

The Malaysian Army has long been seeking to acquire 155mm self-propelled howitzers (SPH), but their efforts have faced setbacks due to cancellations of planned procurements. In January 2023, Prime Minister Anwar Ibrahim's government cancelled the previous administration's order for Turkish-made Yavuz 155mm SPHs and reopened negotiations for the deal. Similarly, the U.S.' offer to sell 30 M109A5 tracked 155mm self-propelled howitzers through the Excess Defence Articles (EDA) programme was also cancelled in 2019.

Currently, the country's ground forces rely solely on towed howitzers with calibres of 105mm and 155mm. The acquisition of 155mm wheeled SPHs is expected to significantly enhance the firepower of the ground forces. According to a press release by Defence Minister Datuk Seri Mohamad Hasan in December 2023, an unspecified number of these wheeled SPHs will be deployed in Sabah, eastern Malaysia.

The Ministry of Defence (MoD) is now evaluating five different SPH systems from various foreign companies. The competition is expected to be intense, particularly between the "Yavuz" from Turkish company Makina ve Kimya Endustrisi (MKE) and Nexter System's "CAESAR" from France. The final decision on the procurement of 18 units of 155mm 52-caliber SPHs is anticipated to be made in 2024. Malaysia is projected to allocate approximately US\$85 million to this programme, to procure the SPHs by 2028.

### Kargu Loitering Munition System

The Malaysian Armed Forces (Angkatan Tentera Malaysia – ATM) are planning to acquire the Kargu loitering munition system from Turkish company STM (Savunma Teknolojileri Mühendislik ve Ticaret A.Ş.). The Kargu system is a portable quadcopter drone equipped with 1.3 kg of explosives and backed by Artificial Intelligence (AI)-supported facial recognition capability. According to the manufacturer, it can autonomously navigate using its unique flight control system. Furthermore, the platform is designed for precision strikes on low-signature targets, even those beyond the line of sight. These systems possess the capability to engage both stationary and moving targets in day and night conditions. They can be deployed individually or as a group, known as a swarm, in a variety of scenarios ranging from counterinsurgency to countering artillery and neutralizing enemy air defence operations.

While specific details are yet to be disclosed, it is anticipated that Malaysia will allocate approximately US\$10 million for the procurement of these systems between 2024 and 2025.



# PAKISTAN



During the forecast period, the Pakistani artillery systems market is projected to reach a cumulative value of US\$350 million. Currently, the country's armed forces have approximately 500 tracked self-propelled howitzers, including 200 M109A2s, 115 M109A5s, and 123 M109Ls, along with 60 M110/M110A2s mounted on tracked chassis with 203mm calibre ammunition. However, there is a need for a lighter self-propelled howitzer that can be easily deployed in the mountainous regions, mainly to counter the Indian K-9 Vajra howitzers. Therefore Pakistan's immediate focus is to acquire 236 units of the SH-15 155mm self-propelled howitzers from Chinese manufacturer Norinco during the forecast period, 2023-2028.

**TABLE 15: PAKISTAN: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**

Types	2023	2024	2025	2026	2027	2028	Total
Gun/tube type artillery	75.0	75.0	100.0	100.0	-	-	350.0
<b>Total</b>	<b>75.0</b>	<b>75.0</b>	<b>100.0</b>	<b>100.0</b>	<b>-</b>	<b>-</b>	<b>350.0</b>

**FIGURE 16: PAKISTAN: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**



## KEY PROGRAMMES:

### SH-15 155mm self-propelled howitzers

In June 2019, Pakistan and the Chinese state-owned defence manufacturer Norinco signed a contract valued at US\$512 million for the delivery of 236 SH-15 155 mm wheeled self-propelled howitzers (SPHs). The contract also includes provisions for the transfer of technology (ToT).

The SH-15 is based on a 6x6 Shaanxi truck chassis, featuring an armoured cabin at the front and a 155 mm gun-howitzer mounted at the rear. This configuration protects against small arms fire and artillery shell splinters. The howitzer is equipped with a digital fire-control system (FCS) to enhance

precision and targeting capabilities. Notably, the SH-15 employs a semi-automatic loader and can achieve a firing rate of 4-6 rounds per minute. Its maximum firing range is 20 km with standard ammunition and extends to 53 km when employing rocket-assisted artillery projectiles.

The first batch of the SH-15s was delivered in January 2022, followed by a subsequent batch of 56 SPHs in April 2023. Since it has the capability to react quickly in high-plateau regions, Pakistan has already deployed some of these howitzers along the Line of Control (LoC), which it shares with India. Deliveries are expected to culminate in 2026.

# SINGAPORE

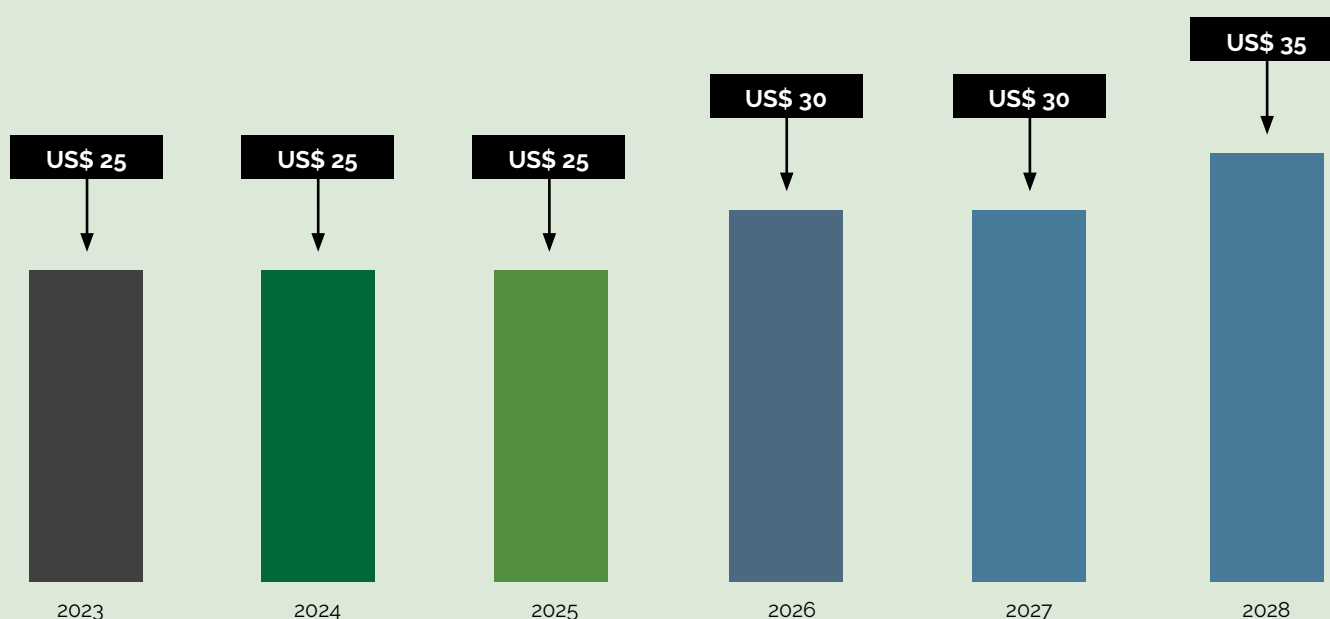


Despite being a small country, Singapore is a key defence market in Asia with a budget of US\$13.4 billion in 2023, a 10% increase from 2022. The country's Next-Gen Singapore Armed Forces' (SAF) – 2030 programme aims to integrate advanced systems throughout its armed forces. Artillery systems is one such area of focus with the country acquiring Next-Generation Howitzers (NGH) for the Army by 2030. The Singaporean artillery systems market is expected to increase from US\$25 million in 2023 to US\$35 million in 2028 at a CAGR of 7.0%. Cumulatively, the market is expected to value US\$170 million between 2023 and 2028.

**TABLE 16: SINGAPORE: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**

Types	2023	2024	2025	2026	2027	2028	Total
Gun/tube type artillery	25.0	25.0	25.0	30.0	30.0	35.0	170.0
<b>Total</b>	<b>25.0</b>	<b>25.0</b>	<b>25.0</b>	<b>30.0</b>	<b>30.0</b>	<b>35.0</b>	<b>170.0</b>

**FIGURE 17: SINGAPORE: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**



## KEY PROGRAMMES:

### Next-Generation Howitzer (NGH)

One of the main areas of focus for the Singapore Armed Forces (SAF) is the development and procurement of a replacement for its Primus SPHs and FH2000 towed guns that are fast approaching the end of their operational lives. Even though not much is known about the country's Next-Generation Howitzer (NGH) programme, it is estimated to be in development currently by domestic company Singapore Technologies Kinetics (STK), with first deliveries expected by 2024. These self-propelled howitzers (SPHs) are intended to replace the long-serving Primus SPHs and

FH2000 towed guns, which were also manufactured by STK. While specific technical details about the NGH programme remain shrouded in secrecy, the systems are expected to be similar to the BAE Systems Archer platform, featuring a fully automated self-loading 155mm gun and a lean crew of 2-4 personnel. The NGH is expected to offer enhanced fire effectiveness and improved mobility, delivering superior performance compared to their predecessors. Singapore is expected to spend around US\$170 million for this programme, over the period 2023 to 2028.

# SOUTH KOREA

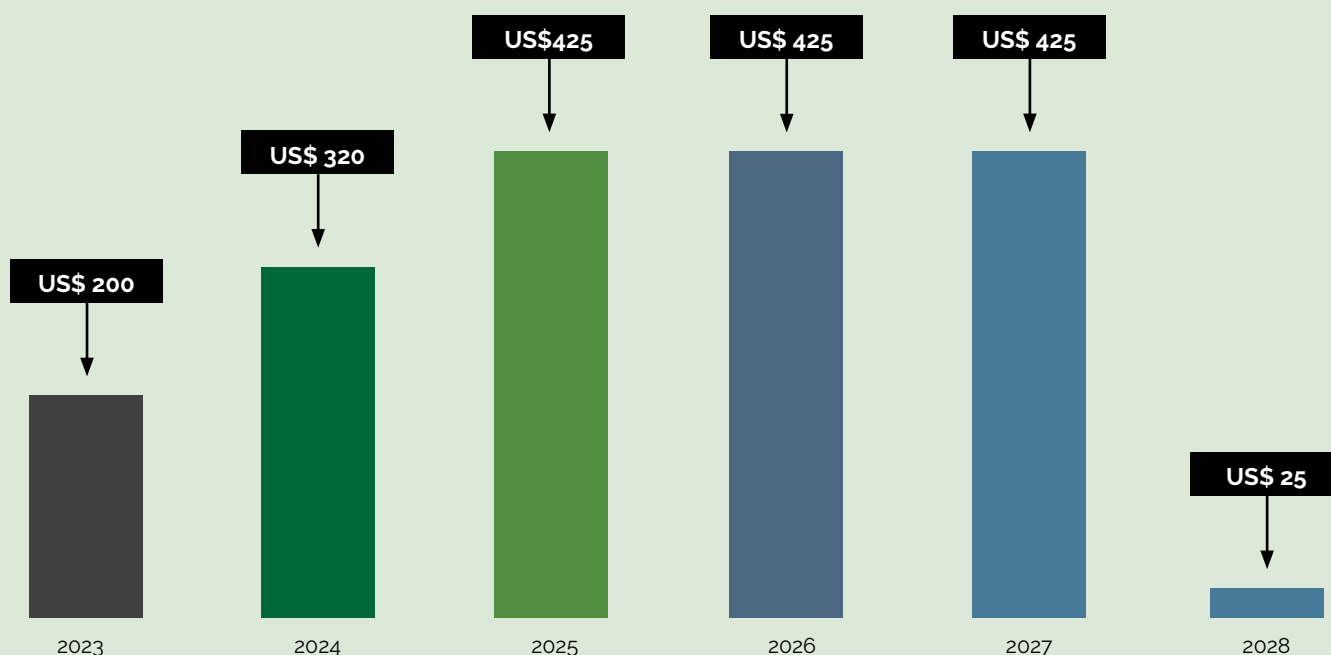


In the field of artillery systems, South Korea holds a prominent position both as a buyer and producer. Hanwa Defense, a domestic defence manufacturer, has established itself as a leading supplier of howitzers worldwide. As of 2022, Hanwa's K9 Thunder self-propelled howitzer (SPH) series commanded a remarkable 52% share of the global SPH market. The South Korean market for artillery systems is projected to have a cumulative value of US\$1.8 billion over the forecast period. Key programmes within this market include the ongoing upgrades to the K9 Thunder self-propelled howitzers and the development of associated precision-guided munitions.

**TABLE 17: SOUTH KOREA: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**

Types	2023	2024	2025	2026	2027	2028	Total
Gun/tube type artillery	200.0	300.0	400.0	400.0	400.0	-	1,700.0
Precision ammunition	-	20.0	25.0	25.0	25.0	25.0	120.0
<b>Total</b>	<b>200.0</b>	<b>320.0</b>	<b>425.0</b>	<b>425.0</b>	<b>425.0</b>	<b>25.0</b>	<b>1,820.0</b>

**FIGURE 18: SOUTH KOREA: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**



## KEY PROGRAMMES:

### K9 Thunder howitzers - Upgrade

In June 2023, the Defence Acquisition Programme Administration (DAPA) of South Korea approved a project to enhance the performance of the K9 Thunder 155 mm/52 calibre self-propelled howitzers (SPHs) currently in service with the Republic of Korea Army (RoKA).

According to a press release from DAPA, the objective of the project is to enhance the striking capability of the K9 howitzers. The upgraded variant will feature a 58-caliber gun, like the U.S. Army's M1299 howitzer, and will incorporate ramjet munitions to achieve a maximum range exceeding 80 km. The howitzers will also be equipped with automated turrets and crew safety equipment as part of the upgrade. Additionally, the project will improve the rate of fire of the cannon from the existing six rounds per minute to nine rounds per minute with the introduction of a new reloading automation system and remote operation technology.

Although the K9 Thunder was initially developed by Dongmyeong Heavy Industries, Kia Heavy Industry, Poongsan Corporation, and Samsung Aerospace Industries for the RoKA in 1999, it is currently manufactured by Hanwha Defense. DAPA has allocated a budget of US\$1.8 billion for the project, and Hanwha Defense is expected to upgrade the existing 1,136 SPHs between 2023 and 2027.

### Precision guided munitions for K9 Platforms

Furthermore, alongside the upgrades to the K9 Thunder's range and firepower, the DAPA Committee sanctioned around US\$339 million in November 2022 for the development and procurement of precision-guided munitions specifically designed for the K9 platform. The development of these munitions is projected to commence in 2024, with final deliveries expected by 2036. The Republic of Korea Army (RoKA) is estimated to allocate approximately US\$120 million towards this programme between 2023 and 2028.

# EGYPT

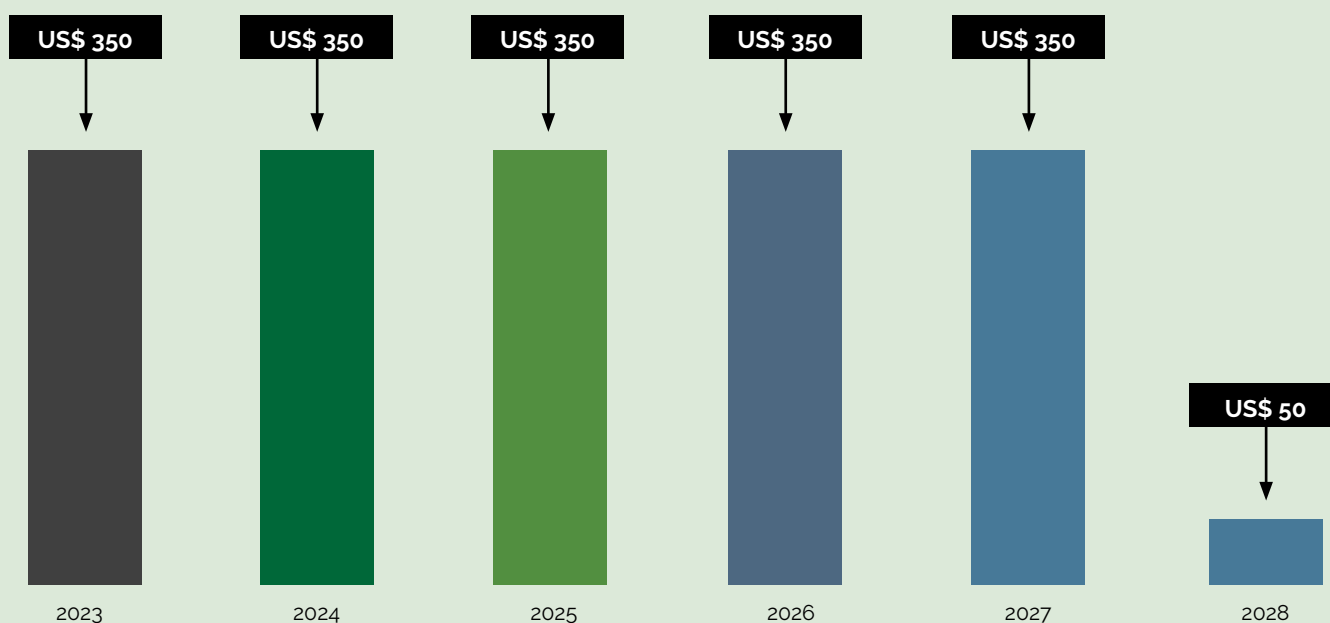


The Egyptian market for artillery systems is expected to cumulatively value US\$1.8 billion over the forecast period. The key programmes include the procurement of 200 units of K9 Thunder self-propelled howitzers (SPH) and the modernization of the M46-1M 130mm towed field gun and the D-30 122mm towed howitzers. Interestingly, this is the first export of the K9 system to an African country after many such deals with countries in Europe and the Asia-Pacific.

**TABLE 18: EGYPT: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**

Types	2023	2024	2025	2026	2027	2028	Total
Gun/tube type artillery	200.0	300.0	400.0	400.0	400.0	-	1,700.0
Gun/tube type artillery	350.0	350.0	350.0	350.0	350.0	50.0	1,800.0
<b>Total</b>	<b>350.0</b>	<b>350.0</b>	<b>350.0</b>	<b>350.0</b>	<b>350.0</b>	<b>50.0</b>	<b>1,800.0</b>

**FIGURE 19: EGYPT: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**



## KEY PROGRAMMES:

### K9 Thunder Howitzers

During the IDEX International Defence Exhibition & Conference held in Abu Dhabi in February 2022, Hanwha Defense secured a contract worth US\$1.7 billion to supply around 200 K9 self-propelled howitzers (SPH) and an undisclosed number of K10 ammunition resupply vehicles and K11 fire direction control vehicles to Egypt. The K9s are expected to replace the ageing American-origin M109 155 mm SPHs.

According to the terms of the agreement, Hanwha Defense will initially deliver a batch of vehicles in 2024. The remaining units will be manufactured locally at Factory 200, a government-operated defence manufacturing facility located in Helwan, near Cairo. Egyptian Minister of State for Military Production, Mohamed Ahmed Morsi, stated that eventually, 67% of the components will be produced domestically.

Furthermore, in October 2022, the Egyptian defence company Arab International Optronics Company signed an agreement with Hanwha Defense to locally produce the Automatic Fire Control System (FCS) and other electronic components for the K9 SPH.

It is anticipated that Cairo will receive all the units by 2027. The Egyptian Ministry of Defence plans to invest approximately US\$1.5 billion in this programme over the forecast period.

### M46-1M 130mm Towed Field Gun and the D-30 122mm Towed Howitzer - Modernization

Over the last few years, Egypt has undertaken significant efforts to modernise and enhance its military capabilities, particularly in artillery systems. The country's military factory, known as Factory 200, has been at the forefront of these initiatives, focusing on upgrading two of its ageing artillery systems: the M46-1M 130mm towed field gun and the D-30 122mm towed howitzer.

For the M46-1M, the upgrades involve mounting the cannon on a modified armoured Kraz 6322 6x6 heavy-duty truck chassis, effectively transforming it into a mobile artillery system. This modification allows for swift deployment, rapid relocation, and improved firing accuracy, making it a formidable asset on the battlefield.

Similarly, the D-30s are being converted into mobile artillery systems by mounting them on Ural 4320 trucks with reinforced frames and hydraulic stabilisers. The Ural-4320 is a versatile off-road 6x6 vehicle originally produced for the Russian army at the Ural Automotive Plant in Miass, Russia. The mobile configuration of the D-30 enables it to manoeuvre quickly across diverse terrains and respond effectively to changing battlefield conditions. The reinforced frame and hydraulic stabilisers ensure stability during firing, enhancing accuracy and reducing setup time.

Egypt is expected to allocate approximately US\$300 million on these upgrades between 2023 and 2028.

# MOROCCO

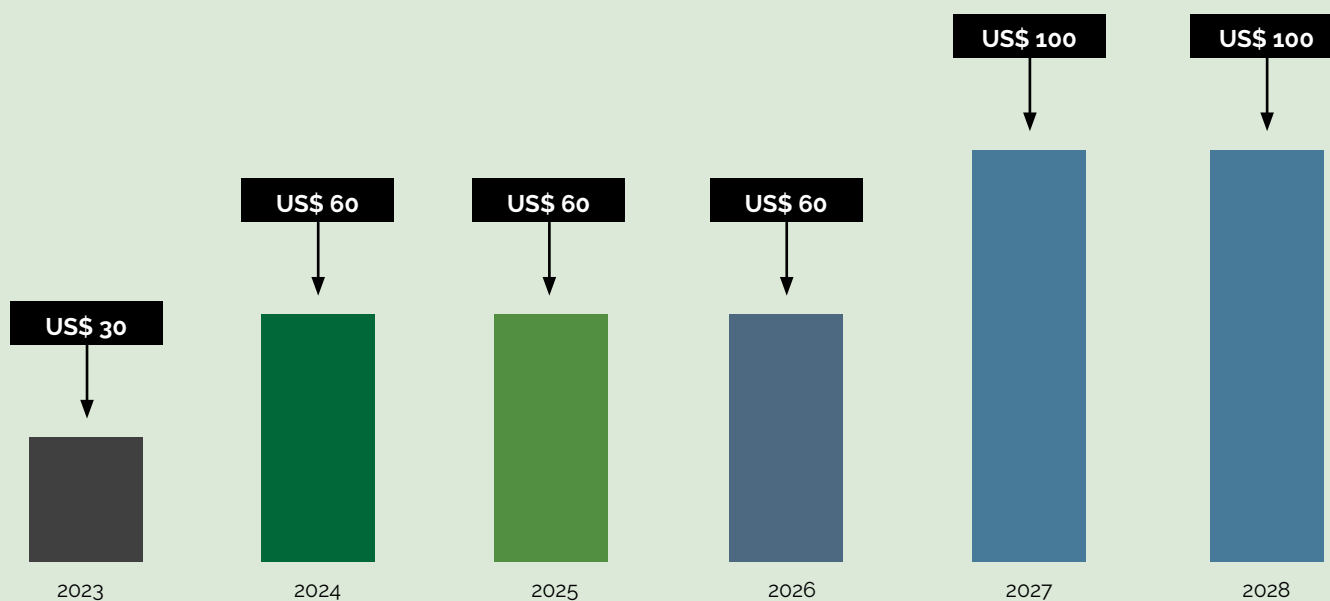


The Moroccan artillery systems market is expected to increase from US\$30 million in 2023 to US\$100 million in 2028 at a CAGR of 27.2%. This exponential increase is due to the procurement of 18 HIMARS from Lockheed Martin for US\$524.2 million. Cumulatively, the market is expected to value US\$410 million between 2023 and 2028.

**TABLE 19: MOROCCO: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**

Types	2023	2024	2025	2026	2027	2028	Total
Rockets	30.0	60.0	60.0	60.0	100.0	100.0	410.0
<b>Total</b>	<b>30.0</b>	<b>60.0</b>	<b>60.0</b>	<b>60.0</b>	<b>100.0</b>	<b>100.0</b>	<b>410.0</b>

**FIGURE 20: MOROCCO: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**



## KEY PROGRAMMES:

### HIMARS - High Mobility Artillery Rocket System

In April 2023, the U.S. State Department granted approval for the potential sale of HIMARS artillery rocket systems and associated equipment to Morocco. This deal, valued at up to US\$524.2 million, consists of 18 M142 High Mobility Artillery Rocket System (HIMARS) launchers, 40 M57 Army Tactical Missile Systems (ATACMS), and 36 M31A2 Guided Multiple Launch Rocket Systems (GMLRS) Unitary, among others. This procurement is expected to enhance Morocco's capability to address present and future threats, bolster border security, and contribute to regional stability. The Royal Armed Forces

(FAR) will also benefit from improved interoperability, as they regularly engage in joint exercises with the U.S. forces to combat terrorism and violent extremist organizations in the Maghreb and Sahel region.

The primary contractors involved in this programme include Lockheed Martin Missiles and Fire Control, L3 Harris Communications, Raytheon, COBHAM Aerospace Connectivity, Oshkosh Defense, AAR Corporation, and AM General LLC. The Moroccan Ministry of Defence is expected to invest approximately US\$410 million in this programme between 2023 and 2028.

# NIGERIA

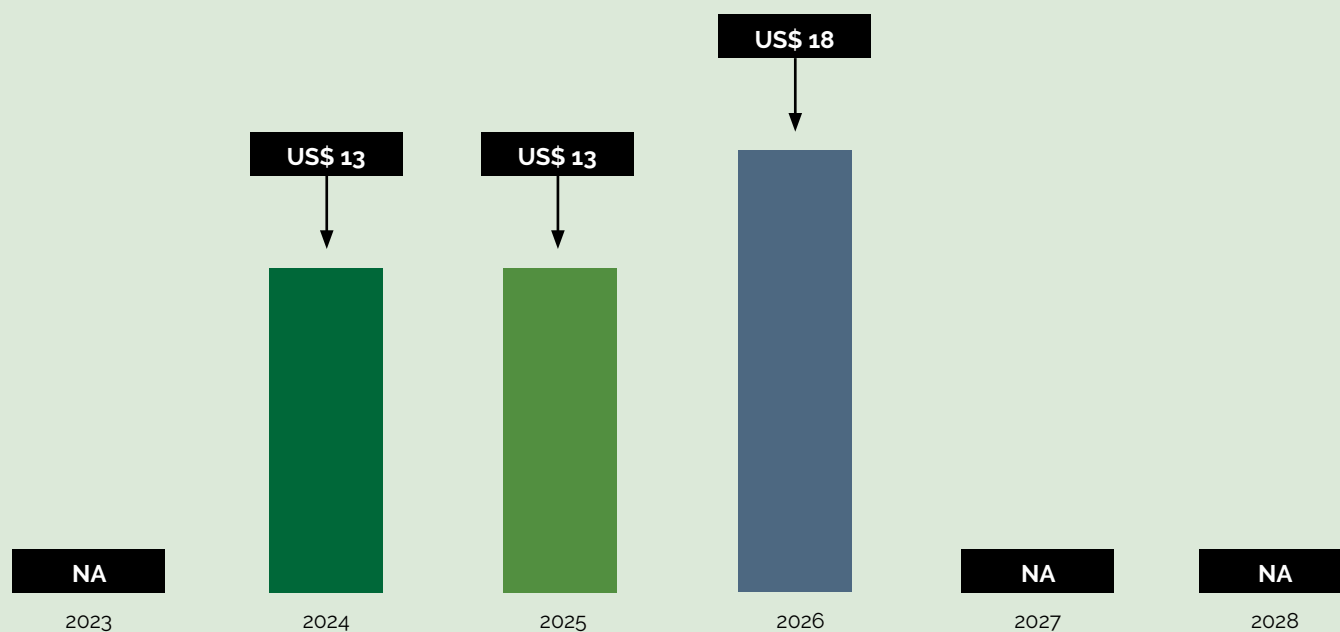


The Nigerian market for artillery systems is expected to cumulatively value US\$44 million over the forecast period. Nigeria's defence expenditure is focused primarily on combating domestic terrorism by Boko Haram and other smaller outfits. Notably, the Nigerian Federal Government announced a special funding budget of US\$725 million in October 2023 to strengthen the fight against insecurity and support the ongoing anti-insurgency efforts. The key programmes in the country include the upgrade of the Palmaria - 155mm self-propelled howitzer and the development of the Ichoku loitering munition.

**TABLE 20: NIGERIA: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**

Types	2023	2024	2025	2026	2027	2028	Total
Gun/tube type artillery	-	10.0	10.0	14.0	-	-	34.0
Loitering munitions	-	3.0	3.0	4.0	-	-	10.0
<b>Total</b>	-	<b>13.0</b>	<b>13.0</b>	<b>18.0</b>	-	-	<b>44.0</b>

**FIGURE 21: NIGERIA: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**





## KEY PROGRAMMES:

### Palmaria - 155mm Self-Propelled Howitzer - Upgrade

In October 2023, the Nigerian Federal Government announced a special funding budget of US\$725 million to strengthen the country's fight against insecurity and support ongoing anti-insurgency efforts. As part of this initiative, the Nigerian Army has allocated approximately US\$34 million for the upgrade of its existing Palmaria 155mm self-propelled howitzer (SPH).

The Palmaria is equipped with a 155mm barrel that features a fume extractor and a muzzle brake, and has an automatic loading system. With this system, the howitzer can fire one round every 15 seconds, one round every minute for an hour, or one round every three minutes continuously. Nigeria acquired around 25 units of the Palmaria from the Italian company OTO Melara in 1982, and the equipment is now due for an upgrade after more than four decades in service. The upgrade process is expected to take place between 2024 and 2026.

### Ichoku Loitering Munition

Loitering munitions offer significant advantages in terms of enhanced strike capabilities, enabling forces to engage targets accurately and precisely at long distances. This attribute makes them particularly appealing to African forces that often confront asymmetrical warfare and have limited resources to allocate to expensive and sophisticated weapon systems. Nigeria is currently engaged in the indigenous development of the Ichoku loitering munition, which has a range of up to 15km and is specifically designed for operations against the Boko Haram terrorist group.

The country has earmarked approximately US\$10 million for the Ichoku loitering munition programme between 2023 and 2028.

# BRAZIL

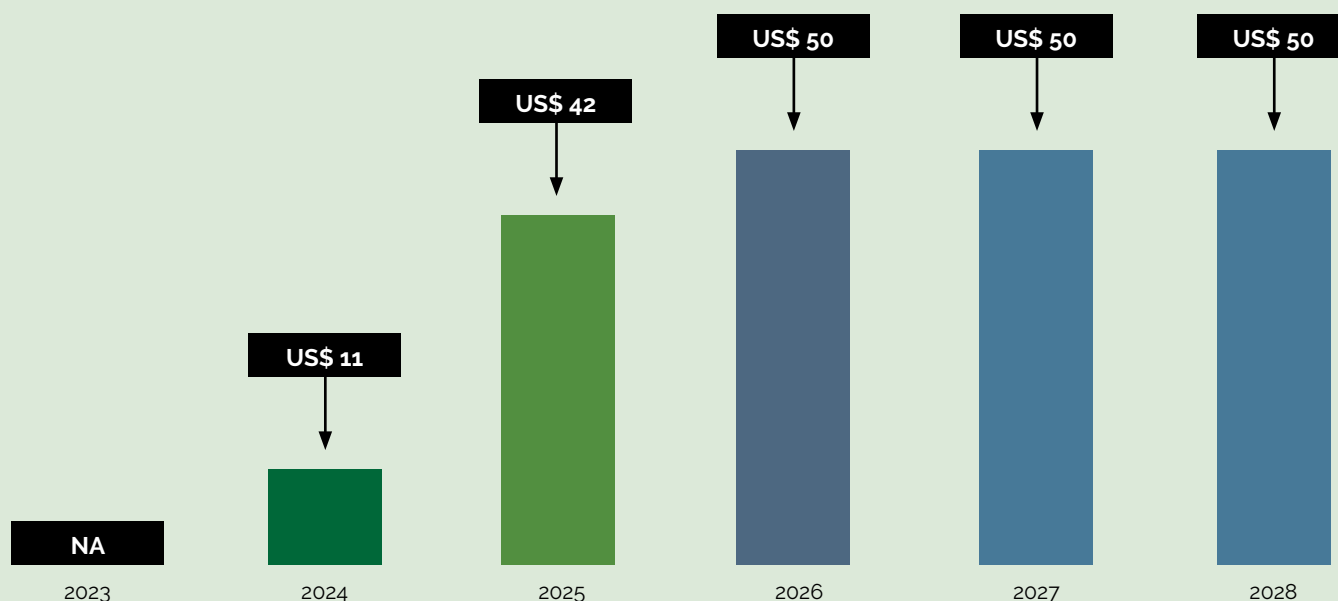


Brazil is the largest defence spender in Latin America with a share of over 40%. The country has issued an RFP for 36 155 mm self-propelled howitzers under the VBC OAP 155mm SR programme. Among the companies vying for this contract include Israeli firm Elbit Systems, French company Nexter Systems, local manufacturer Avibras Industria Aeroespacial, and Bharat Forge from India. This project is a key element of the country's broader strategy to modernise its military capabilities. It also includes the procurement of initial vehicles for evaluation, followed by the procurement of additional systems for deployment within field artillery groups. The Brazilian market for artillery systems is expected to cumulatively value US\$203.4 million over the forecast period.

**TABLE 21: BRAZIL: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**

Types	2023	2024	2025	2026	2027	2028	Total
Gun/tube type artillery	-	11.3	42.1	50.0	50.0	50.0	203.4
Total	-	11.3	42.1	50.0	50.0	50.0	203.4

**FIGURE 22: BRAZIL: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**



## KEY PROGRAMMES:

### VBC OAP 155mm Self-Propelled Artillery

In August 2023, the Brazilian Army issued a request for proposal (RFP) to procure a 155 mm self-propelled wheeled artillery system, as part of the VBC OAP 155mm SR programme. This acquisition aims to replace the current M114A1 howitzers in service. It includes two initial vehicles for assessment at the Army Evaluations Centre, followed by the procurement of an additional 34 systems in different stages to equip three field artillery groups.

The required system specifications include a high-mobility truck chassis with either a 6x6 or 8x8 configuration, providing a range of over 500 km and capable of accommodating up to six crew members. The vehicle is expected to be equipped with a mounted 52-calibre NATO standard cannon, roof-mounted 76 mm smoke grenade launchers, and a mount suitable for a 12.7 mm or 7.62 mm machine gun.

Elbit Systems from Israel, Nexter from France, local company Avibras Industria Aeroespacial, and Bharat Forge from India have reportedly responded to the RFP till now. Elbit Systems plans to offer its ATMOS 2000, which employs a 155mm/52 calibre gun mounted on a 6x6 tactical truck chassis. Nexter, on the other hand, will propose the CAESAR artillery system in both 6x6 and 8x8 truck mount variants. India's Bharat Forge manufactures the Bharat-52 platform. Additionally, Nexter is in discussions with AVIBRAS for a potential collaboration on the project.

Brazil is expected to receive the initial vehicles in 2024 for inspection. A formal contract is expected to be signed in 2025 for the procurement of 34 artillery systems by 2028. The programme's estimated budget amounts to US\$203.4 million, allocated between 2023 and 2028.

# U.S.



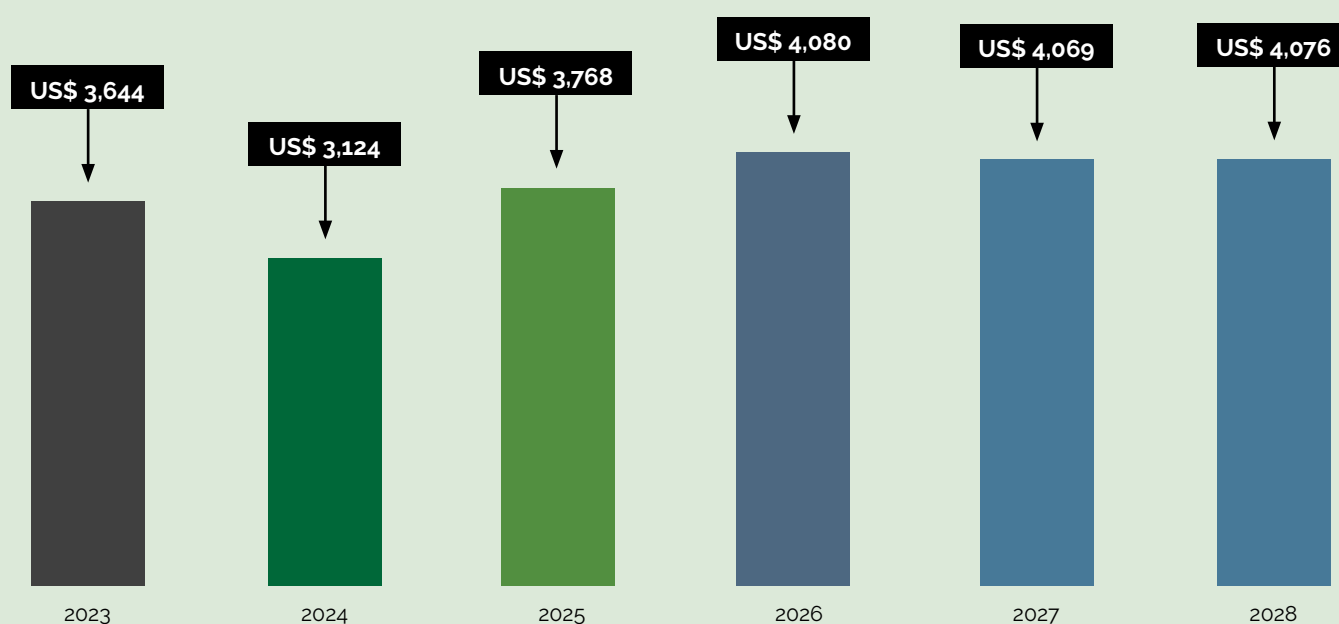
The U.S. is the largest market for artillery systems and related munitions globally, with a value of US\$3.6 billion in 2023, which is expected to increase to US\$4.1 billion in 2028. The country's largest programmes include the Paladin Integrated Management (PIM) - US\$10.1 billion, US\$3.5 billion of which is allocated over the forecast period; Guided Multiple Launch Rocket Systems (GMLRS) - US\$7.4 billion over the forecast period; High Mobility Artillery Rocket Systems (HIMARS) - US\$1.2 billion over the forecast period; Precision Artillery Munitions - US\$1.2 billion over the forecast period and improvements to the existing M270A1 Multiple Launch Rocket System (MLRS) - US\$1.1 billion and 155mm Self Propelled Howitzer (SPH) - US\$637.7 million over the forecast period.

Rockets is unsurprisingly the largest segment owing to their precision-guided capabilities and limited collateral damage. Interestingly, the U.S. made HIMARS are now the most popular rocket system internationally, owing to their proven efficacy in Ukraine's resistance against the Russian invasion. Cumulatively, US\$11.6 billion is expected to be spent on the procurement of rockets over the forecast period, followed by Gun/Tube type artillery systems - US\$8.8 billion (including artillery shells), precision ammunition - US\$1.9 billion, loitering munitions - US\$287.9 million, and target acquisition technologies - US\$229 million.

**TABLE 22: U.S.: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**

Types	2023	2024	2025	2026	2027	2028	Total
Rockets	1,901.0	1,640.9	2,012.9	2,124.4	1,988.2	1,938.6	<b>11,605.8</b>
Gun/tube type artillery	1,343.0	1,226.9	1,344.2	1,513.7	1,642.8	1,696.1	<b>8,766.7</b>
Precision ammunition	308.0	185.8	321.1	356.4	352.7	345.9	<b>1,870.0</b>
Loitering munitions	57.9	30.0	45.0	50.0	50.0	55.0	<b>287.9</b>
Target acquisition technologies (AI)	34.0	40.0	45.0	35.0	35.0	40.0	<b>229.0</b>
<b>Total</b>	<b>3,643.9</b>	<b>3,123.6</b>	<b>3,768.1</b>	<b>4,079.5</b>	<b>4,068.7</b>	<b>4,075.6</b>	<b>22,759.4</b>

**FIGURE 23: U.S.: ARTILLERY MARKET, 2023-2028, US\$ MILLIONS**



## KEY PROGRAMMES:

### Lethal Miniature Aerial Missile System (LMAMS)/ Switchblade 300 Loitering Munition Systems

As part of the Lethal Miniature Aerial Missile System (LMAMS) programme, the US Army has chosen to acquire Switchblade 300 tactical missile systems (TMS) from AeroVironment. The Switchblade 300 is a lightweight, single-man portable system that enables precision-guided, beyond the line-of-sight engagement of obscured or fleeting enemy targets, which are typically challenging to engage with direct-fire weapons. This system also includes a Wave-Off capability that allows the operator to redirect the missile's flight path prior to impact, if necessary. It can be deployed in under two minutes.

The latest contract worth US\$64.6 million was awarded in April 2023, with deliveries scheduled until July 2024. However, in the fiscal budget for 2024, the US Army decided against purchasing additional Switchblade 300 drones and no funding was allocated for the same. A total budget of US\$351.3 million has been allocated for the LMAMS programme to procure 849 LMAMS until 2023.

### Low Altitude Stalking and Strike Ordnance (LASSO)/ Switchblade 600 Loitering Munition Systems

In August 2023, the U.S. Army has launched a programme to rapidly equip soldiers with a portable drone specifically designed to destroy tanks. Called the Low Altitude Stalking and Strike Ordnance venture (LASSO), this programme falls under the supervision of the Program Executive Office Soldier (PEO Soldier). LASSO addresses the army's critical need for lethal unmanned systems on the battlefield. These systems, which can be carried by troops, feature a launch tube, and are equipped with a powerful payload. They also possess an electro-optical and infrared sensor and precise flight controls, which give them the ability to identify and engage distant targets.

In October 2023, the U.S. Army placed an initial order with AeroVironment for approximately 100 units of the Switchblade 600 loitering drones. The Switchblade 600s can travel a considerable distance and loiter for over 40 minutes before engaging armoured targets such as tanks. AeroVironment is scheduled to deliver the Switchblades by July 2024.

### Next Generation Handheld Targeting System Programme

In February 2022, Northrop Grumman was awarded a contract worth US\$252 million to develop a man-portable system for the U.S. Marine Corps (USMC) that enables personnel to identify and locate targets. Part of the Next Generation Handheld Targeting System (NGHTS) programme, the eight-year contract includes not only the production of the system but also testing, engineering, logistics, documentation, and the delivery of spare parts.

Northrop Grumman will provide services for both low-rate initial production and full-rate production of the systems which are intended to replace the existing Portable Lightweight Designator Rangefinder, Joint Terminal Attack

Controller, Laser Target Designator, and Thermal Laser Spot Imager systems. Between 2023 and 2028, the USMC plans to allocate approximately US\$200 million for the procurement of these handheld targeting systems. Deliveries are expected to culminate by 2029.

### Guided MLRS Rocket (GMLRS)

The U.S. Army's GMLRS programme includes the procurement of multiple variants of rocket artillery including the GMLRS Unitary: a 200-pound warhead that targets precise targets and GMLRS Alternative Warhead (AW): a non-cluster munition that engages imprecisely located targets. Both platforms have entered the full-rate production phase. This is a long running programme with around US\$8.5 billion having already been spent before 2023. A further US\$7.4 billion is budgeted during 2023-2028, with more expected to be spent thereafter. In terms of quantity, as of June 2022, the army showed requirements of 20,756 Unitary and 47,568 Alternative Warhead (AW) units. However, these are being evaluated and updated annually and are therefore subject to change.

Lockheed Martin is working as the prime contractor for this programme since 2019 and the latest contract worth US\$4.8 billion was awarded in April 2023. Additionally, the U.S. is expected to spend more than US\$269.2 million between 2023 and 2028 on related R&D efforts to optimise capabilities and improve reliability for the GMLRS.

### MLRS Reduced Range Practice Rockets (RRPR)

Lockheed Martin holds the exclusive contract to supply live training rockets for the Multiple Launch Rocket System (MLRS), under the Reduced Range Practice Rockets (RRPR) programme. These rockets are designed to meet the annual certification and pre-deployment requirements for both the Active and National Guard High Mobility Artillery Rocket System (HIMARS) and M270/M270A1 MLRS launcher units.

The training rockets are equipped with inert payload sections and blunt noses, which reduce their range. The programme covers the expenses associated with the Download/Demate (DL/DM) of the M26 pod and rocket motor for production reuse. The total cost also includes bunker storage, procurement of performance-oriented packaging (POP) boxes, inert warheads, reworked igniters, and addressing RRPR obsolescence.

This programme has been ongoing for several years with a procurement of up to 60,819 units prior to 2023, amounting to approximately US\$391.3 million. An additional 6,552 units are projected to be procured between 2023 and 2028, at an estimated cost of around US\$142.1 million.

### M777A2 Howitzer/Lightweight 155mm Howitzer (LW155) -Modernization (Army, Marine Corps)

The LW155 (Lightweight 155mm Howitzer), also referred to as the M777A2, is a collaborative programme between the U.S. Marine Corps (USMC) and the U.S. Army. Its purpose is to provide direct, reinforcing, and general support fires

to manoeuvre forces and direct support artillery. The USMC first introduced the M777A2 in 2005 and has since deployed it to all active units. The Army has also integrated the howitzer into its Stryker Brigade Combat Teams (SBCT) and Infantry Brigade Combat Teams (IBCT), including the National Guard.

To ensure the operational continuity of the M777A2 in GPS-contested environments, the DoD is making efforts to modernise its digital fire control system (DFCS) and electronic components. With the addition of the DFCS, the howitzer will gain the capability to programme and fire improved precision-guided munitions accurately up to ranges exceeding 40km, with a Circular Error Probable (CEP) accuracy of better than 10 meters.

The U.S. Army is expected to invest US\$229.5 million until 2028 to upgrade around 306 M777A2 systems, with the USMC spending around US\$1.5 billion during the same period.

### Assured Precision Weapons and Munitions (APWM) Project

The Assured Precision Weapons and Munitions (APWM) project involves the development of various prototype technologies to augment the precision and lethal capabilities of the various weapons and munitions in service with the country's armed forces. Part of the National Defence Strategy, this programme has a budget allocation of approximately US\$256.3 million between 2023 and 2028, which is expected to be used for hiring weapons and munitions experts in various roles.

### M109 FOV Modifications

The M109 Family of Vehicles (FOV) includes the M109A6 Paladin Self-Propelled Howitzer (SPH) and the M992A2 Field Artillery Ammunition Supply Vehicle (FAASV), as well as the M109A7 Self-propelled Howitzer (SPH) and M992A3 Carrier, Ammunition, Tracked (CAT) vehicles. To address issues identified in the field and ensure operational readiness, the U.S. Army is making continuous investments in engineering design, testing, hardware procurement, and application improvements. These enhancements aim to improve safety, operational efficiency, and integration of new equipment to the M109 FOVs.

The U.S. Army has allocated a total budget of US\$2.4 billion for this modification programme until 2026, with US\$188.1 million dedicated to the forecast period. This funding will support various aspects of programme management necessary to maintain and support the fleet of Self-Propelled Howitzers (SPHs) and Field Artillery Ammunition Supply Vehicles (FAASVs) / Carrier, Ammunition, Tracked (CATs) vehicles deployed across different Army battalions.

### M119 Modifications

The M119A3 Towed Howitzer provides direct fire support for the Infantry Brigade Combat Teams (IBCTs). The funding allocated for the M119A3 modifications budget aims to implement necessary enhancements to ensure continuous operational availability. These enhancements include the integration of digital fire control components, enabling secure digital fire missions, and maintaining interoperability on the battlefield.

The modifications encompass several key updates, such as upgrading the legacy radio system to a modern Software Defined Radio capable of supporting new encryption protocols. Additionally, the Fire Control Computer (FCC) will be upgraded to accommodate the migration to a new operating system. The programme's funding will also cover the installation and retrofitting of modification kits to the M119A3 howitzer.

This programme has been ongoing for a significant period, with a previous expenditure of US\$396.7 million before 2023. It is projected that around 505 platforms will undergo upgrades between 2023 and 2028, with an estimated cost of approximately US\$26.5 million. Further allocations are expected to be made beyond this timeframe to continue upgrading additional platforms.

### Long Range Precision Munition (LRPM)

The Long-Range Precision Munitions (LRPM) programme enhances the capabilities of the Army by providing improved weapons, sub-systems, and munitions with extended range. These advancements enable a rapid response in combat environments, ultimately enhancing the survivability of both warfighters and weapon systems in anti-access/area denial (A2/AD) and positioning, navigation, and timing (PNT) denied environments.

The LRPM systems are designed to seamlessly interoperate and coordinate with other weapon systems and munitions over long distances. This programme has been ongoing for an extended period, resulting in the procurement of approximately 432 units at a cost of roughly US\$82.9 million prior to 2023. From 2023 to 2028, an additional 110 LRPM systems are expected to be procured at an estimated cost of around US\$69.6 million.

Additionally, the U.S. is expected to spend around US\$200 million between 2023 and 2028 on related R&D efforts to undertake technical evaluations, optimise capabilities, and improve reliability for LRPM systems.

### 155mm Artillery Propulsion XM654

The allocated Research, Development, Test and Evaluation (RDT&E) funding for the 155mm Artillery Propulsion systems aims to support various initiatives. These include the "Supercharge" component development, enhancing propellant for extended cannon lifespan, conducting risk reduction activities and testing, as well as facilitating the integration of the Extended Range Cannon Artillery System of Systems (ERCA SoS). The "Supercharge" component is a standalone 155mm propelling charge that is crucial for achieving the maximum range requirements of the Extended Range Cannon Artillery (ERCA) Self-Propelled Howitzer (SPH). A total budget of US\$40 million has been allocated for RDT&E spending on this programme from 2023 to 2028.

### Paladin Integrated Management (PIM)

The U.S. Army's M109A7 self-propelled howitzer, also known as the Paladin Integrated Management (PIM) vehicle, entered full-rate production in 2020. This procurement is expected to replace the current fleet of M109 vehicles consisting of the M109A6 SPH and the M992A2 Field Artillery Ammunition Supply Vehicle (FAASV). This is a long running programme with as many as 352 units procured before 2023 at a cost of around US\$4.3 billion. A total of 205 additional platforms are expected to be procured during 2023-2028, at a cost of around US\$3.5 billion, which would leave an additional 135 units to be acquired for US\$2.3 billion.

In May 2021, the North Carolina National Guard became the first U.S. National Guard Unit to receive the howitzer which is manufactured by BAE Systems. Among the upgrades include advanced digital systems, a six-hundred-volt onboard power system and enhanced range. Additionally, the U.S. is expected to spend more than US\$475 million on related R&D efforts to optimise capabilities and improve reliability for the M109A7 SPH.

### 155mm Self-Propelled Howitzer Improvements

This is part of the Extended Range Cannon Artillery (ERCA) modernization programme that aims to include new capabilities and technologies onto the M109A7 SPH platform. These include: a new cannon, gun mount, gun drive systems, fire control systems, and rate of fire system advancements to improve the howitzer's mobility, survivability, reliability, supportability, and lethality. A total of US\$637.7 million has been allocated to this programme during the period 2023-2028.

### M270A1 Multiple Launch Rocket System (MLRS) – Modifications

In 2017, the U.S. Army awarded a contract for the modernization of 160 ageing MLRS M270A0s to the M270A2s version, as part of the MLRS Fleet Expansion initiative. Additionally, the army also decided to upgrade its existing inventory of 190 M270A1 MLRS in order to extend their service life to 2050 and beyond. This will eventually result in 350 modified launchers with Improved Armored Cabs (IAC), Bradley commonality improvements and Common Fire Control Systems (CFCS). This is a long running programme with US\$2.0 billion already being spent on it before 2023. Another US\$1.1 billion has been budgeted during 2023-2028 with more expected to be allocated thereafter. Additionally, the U.S. Army is expected to spend more than US\$46.3 million on related R&D efforts to optimise capabilities and improve reliability for the MLRS.

### High Mobility Artillery Rocket System (HIMARS)

The U.S. Army's M142 High Mobility Artillery Rocket System (HIMARS) is a long-standing programme with Lockheed Martin as the principal supplier. A total of 614 systems have been budgeted till 2028 at a cost of around US\$3.6 billion. The HIMARS, which can be transported via the C-130 or the

C-17 aircraft, is capable of firing one pod of precision rockets from the current and future Multiple Launch Rocket System (MLRS) Family of Munitions (MFOM). According to the country's National Defence Authorization Act, the HIMARS is necessary for homeland defence missions, domestic emergency responses, and to provide military support to civil agencies if needed.

Furthermore, the U.S. Army plans to allocate an additional amount of US\$579 million by 2028 for implementing modifications to address safety concerns, upgrade the fire control system, and resolve Command, Control, Communications, Computer, and Intelligence (C4I) obsolescence issues within the HIMARS fleet. Additionally, an allocation of US\$29.6 million is earmarked for research and development (R&D) endeavours aimed at optimizing capabilities and enhancing the reliability of the M142 launchers.

### Artillery Projectiles – 155MM

The U.S. Army has undertaken a multi-year programme to procure different types of artillery ammunition for both self-propelled and towed platforms. These include the 155mm WP (White Phosphorus) M825A1, the 155mm M1124 Visual Light (VL) Illumination Projectile, 155mm M1123 Infra-Red (IR) Illumination Projectile, the M795 High Explosive (HE) Projectile, the XM113 High Explosive (HE) Rocket Assisted Projectile (RAP), the M116 Series Base Ejection Projectile, the 155mm Bonus MK2 Projectile, the XM1128 Extended Range High Explosive (HE) Projectile, the 155mm Extended Range Spotting M1121 Artillery Round and the XM1210 High Explosive (HE) Rocket Assisted Projectile (RAP). A total of US\$1.3 billion has been allocated for this procurement between 2023-2028.

### Artillery Cartridges, 75MM & 105MM

The Army has undertaken the procurement of various artillery cartridges compatible with 75mm and 105mm ammunition. These include the 105mm M1 High Explosive (HE) and the 105mm M84 Hexachloroethane Zinc Oxide (HC) Smoke compatible with the M762 Electronic Time (ET) series Fuze. This is a long running programme with a total of US\$3.2 billion allocated to it until 2028.

### Precision Artillery Munitions:

The procurement of precision artillery munitions is part of the Army's Long Range Precision Fires (LRPF) modernization programme. This includes the Excalibur and Cannon-Delivered Area Effects Munitions (C-DAEM) Armor munitions. The Excalibur is a 155mm extended range precision munition that is made in partnership with the Swedish government. It has a range of 40.5 kms when fired from 39 calibre systems and as much as 70kms from 58 calibre systems. The 155mm C-DAEM Armor is a cannon munition that includes a seeker, shape charge warhead and M-code GPS that gives it anti-armour capability. A total of US\$1.2 billion has been allocated to this programme over the period 2023-2028.

### Artillery Propellants, Fuzes and Primers

The U.S. Army's Long Range Precision Fires (LRPF) Modernization programme involves the procurement of various artillery propellants, fuzes and primers. These include the Multi-Option Fuze for Artillery (MOFA) compatible with all 105mm and 155mm cannon systems, the Modular Artillery Charge System (MACS) M231 that is designed to achieve ranges between 3kms to 12kms, the Precision Guidance Kit (PGK) that provides accuracy for 155mm M795 and M549A1 High Explosive (HE) projectiles and the M739A1 Point Detonating (PD) and Delay Fuze that enable 105mm and 155mm projectiles to address point detonating/delay artillery functions. Also included are the Supercharge, which helps the M1299 Extended Range Cannon Artillery (ERCA) SPH achieve maximum range, the Stub Charge which is required to fire the Modular Artillery Charge System (MACS) propellant at different charges and the Long Range-Precision Guidance Kit that can provide accuracy even when the GPS is jammed. Several original equipment manufacturers (OEMs) including General Dynamics, Armtec Defense Products, St. Marks Powder Inc., Conco Inc. are working on the production of these systems. A total of US\$1.5 billion has been allocated for this programme between 2023 and 2028.

### Artillery Weapons System – Navy:

The Navy is procuring three main weapons systems to enhance its expeditionary long-range precision fires capabilities. These include the Navy/Marine Expeditionary Ship Interdiction System (NMESIS), the High Mobility Artillery Rocket System (HIMARS) and the Long-Range Precision Fires Launchers. A total of US\$2.7 billion has been allocated by the Navy towards the procurement of 117 of these systems until 2028.

### Guided Multiple Launch Rocket System (GMLRS) - Navy

The U.S. Navy is procuring 1,938 GMLRS rockets that will be fired from the HIMARS launchers. These systems are being procured in two variants: Unitary (U) and Alternative Warhead (AW). The Unitary uses a 200-pound high explosive warhead to destroy point targets with minimal collateral damage. GMLRS Alternative Warhead (AW) is a non-cluster munition that looks to destroy the same target as a dual-purpose improved conventional munition (DPICM). This means that the shell separates into various submunitions prior to engaging with the target. Both variants are currently in full rate production. The total value of this programme is US\$295.8 million, and Lockheed Martin is the principal supplier.

### Artillery Munitions – Navy

The Navy is procuring various 155mm artillery ammunition to address Littoral Operations in Contested Environments (LOCE) and the Indo-Pacific region. These can be fired from M777 howitzers and also include primers, propellants, projectiles, and fuzes. The Artillery fuzes include point detonating, multi-option, electronic time and precision-guided systems. The Navy allocated US\$552.3 million for this programme before 2023 and US\$653.4 million between 2023-2028.



# BIBLIOGRAPHY

Style followed: Author's Last Name, First Name. "Page Title." Website Name. Month Day, Year. URL.

- Adamowski, Jaroslaw. "Poland to buy hundreds of SKorean Chunmoo multiple-rocket launchers." Defense News. October 14, 2022. <https://www.defensenews.com/global/europe/2022/10/14/poland-to-buy-hundreds-of-s-korean-chunmoo-multiple-rocket-launchers/>.
- Adamowski, Jaroslaw. "Poland buys more howitzers as local defence exhibit kicks off." Defense News. September 06, 2022. <https://www.defensenews.com/global/europe/2022/09/06/poland-buys-more-howitzers-as-local-defence-exhibit-kicks-off/>.
- Adamowski, Jaroslaw. "Lithuania buys Switchblade 600 drones." Defense News. December 24, 2022. <https://www.defensenews.com/unmanned/2022/12/23/lithuania-buys-switchblade-600-drones/>.
- Aero Vironment. "United States Army Awards Aerovironment \$20.6 Million Switchblade 300 Tactical Missile Systems Contract." September 22, 2022. <https://www.avinc.com/resources/press-releases/view/united-states-army-awards-aerovironment-20.6-million-switchblade-300-tactical-missile-systems-contract>.
- Agence France Presse. "France, Australia To Supply Ukraine With Artillery Shells." Barrons. January 30, 2023. <https://www.barrons.com/news/france-australia-to-supply-ukraine-with-155mm-shells-french-minister-01675093208>.
- Aina, Damilola. "FG budgets N552.6bn for arms, anti-terror fight." Punch Nigeria. November 01, 2023. <https://punchng.com/fg-budgets-n552-6bn-for-arms-anti-terror-fight/>.
- Ames, Darrell. "Army announces contract award for TOW Weapon System." army.mil. August 18, 2023. [https://www.army.mil/article/269217/army\\_announces\\_contract\\_award\\_for\\_tow\\_weapon\\_system](https://www.army.mil/article/269217/army_announces_contract_award_for_tow_weapon_system).
- Applied Technology Associates. "Applied Technology Associates Awarded Contract for Independent Target Acquisition and Tracking System (ITATS) as Part of the U.S. Army Directed Energy-Maneuver Short Range Air Defense (DE-MSHORAD) Initiative." Pnewswire. June 09, 2020. <https://www.pnewswire.com/news-releases/applied-technology-associates-awarded-contract-for-independent-target-acquisition-and-tracking-system-itats-as-part-of-the-us-army-directed-energy-maneuver-short-range-air-defense-de-mshorad-initiative-301072039.html>.
- Ardiansyah, Yulian. "Malaysia Eyes Kargu Loitering Munitions Acquisition." GBP Aerospace & Defence. February 28, 2022. <https://gbp.com.sg/stories/malaysia-eyes-kargu-loitering-munitions-acquisition/>.
- Army Recognition. "Indian Army plans to buy Medium Range Precision Kill System with loitering munitions." December 23, 2021. [https://www.armyrecognition.com/defense\\_news\\_december\\_2021\\_global\\_security\\_army\\_industry/indian\\_army\\_plans\\_to\\_buy\\_medium\\_range\\_precision\\_kill\\_system\\_with\\_loitering\\_munitions.html#google\\_vignette](https://www.armyrecognition.com/defense_news_december_2021_global_security_army_industry/indian_army_plans_to_buy_medium_range_precision_kill_system_with_loitering_munitions.html#google_vignette).
- Army Technology. "Germany, Norway, and Denmark to buy 16 ZUZANA-2 howitzers for Ukraine." October 03, 2022. <https://www.army-technology.com/news/germany-norway-denmark-zuzana2-ukraine/>.
- Army Technology. "Sweden sends artillery ammunition worth \$46.86m to Ukraine." September 01, 2022. <https://www.army-technology.com/news/sweden-sends-artillery-ammunition/>.
- Army Technology. "Lithuania signs deal to procure 18 Caesar howitzers from France." January 02, 2023. <https://www.army-technology.com/news/lithuania-18-caesar-howitzers-france/>.
- ASDNews. "Lithuania - M142 High Mobility Artillery Rocket System (HIMARS)." November 09, 2022. <https://www.asdnews.com/news/defense/2022/11/09/lithuania-m142-high-mobility-artillery-rocket-system-himars>.
- Asian News International (ANI). "Indian Army to buy 307 ATAGS howitzers for deployment along China, Pak border." Deccan Chronicle. March 02, 2023. <https://www.deccanchronicle.com/nation/in-other-news/020323/indian-army-to-buy-307-atags-howitzers-for-deployment-along-china-pak.html>.
- Barreira, Victor. "Brazil issues request for proposals for self-propelled artillery system." August 15, 2023. <https://www.janes.com/defence-news/news-detail/brazil-issues-request-for-proposals-for-self-propelled-artillery-system>.
- Bisht, Inder Singh. "Germany Plans Israeli Rocket Artillery to Replace MARS MLRS Sent to Ukraine." TheDefensePost. October 23, 2023. [https://www.thedefensepost.com/2023/10/23/germany-israeli-rocket-artillery/?expand\\_article=1](https://www.thedefensepost.com/2023/10/23/germany-israeli-rocket-artillery/?expand_article=1).
- Bisht, Inder Singh. "Germany Approves Large Ammo Purchase for Military Stocks, Ukraine." TheDefensePost. July 10, 2023. <https://www.thedefensepost.com/2023/07/10/germany-ammo-stocks-ukraine/>.
- Bisht, Inder Singh. "Indian Army Procures Over 400 Locally-Made Kamikaze Drones." TheDefensePost. April 26, 2023. <https://www.thedefensepost.com/2023/04/26/indian-army-kamikaze-drones/>.
- Boguslavsky, Eyal. "Finland procures long-range rockets from Israel." Israel defense. December 21, 2022. <https://www.israeldefense.co.il/en/node/56680>.
- Business Standard. "India to become manufacturing hub for cutting-edge artillery ammunition." February 18, 2023. [https://www.business-standard.com/article/current-affairs/india-to-become-manufacturing-hub-for-cutting-edge-artillery-ammunition-123021800631\\_1.html](https://www.business-standard.com/article/current-affairs/india-to-become-manufacturing-hub-for-cutting-edge-artillery-ammunition-123021800631_1.html).
- Business Wire. "AeroVironment Awarded \$64.6 Million Contract by U.S. Army for Switchblade 300 Loitering Missile Systems." April 26, 2023. <https://www.businesswire.com/news/home/20230426005397/en/AeroVironment-Awarded-64.6-Million-Contract-by-U.S.-Army-for-Switchblade-300-Loitering-Missile-Systems>.
- BusinessToday.In. "Govt approves arms procurement worth Rs 2,290 crore including 72,000 assault rifle from US." September 28, 2020. <https://www.businesstoday.in/latest/economy-politics/story/govt-approves-arms-procurement-worth-rs-2290-crore-including-72000-assault-rifle-from-us-274070-2020-09-28>.
- Chuter, Andrew. "BAE Systems gets \$3.2 billion deal so British forces can reload." Defense News. December 01, 2020. <https://www.defensenews.com/global/europe/2020/11/30/bae-systems-gets-32-billion-deal-so-british-forces-can-reload/>.
- CSG Aerospace. "Romania plans to acquire 90 self-propelled howitzers." Defence Industry Europe. July 11, 2023. <https://defence-industry.eu/romania-plans-to-acquire-90-self-propelled-howitzers/>.
- Darling, Daniel. "Poland Orders Additional Kg Self-Propelled Howitzers as Law & Justice Party Government Nears Exit." Defense & Security Monitor. December 05, 2023. <https://dsm.forecastinternational.com/2023/12/05/poland-orders-additional-kg-self-propelled-howitzers-as-law-justice-party-government-nears-exit/>.
- Defence Industry Europe. "Senop enhances Finland's defence capabilities with state-of-the-art target acquisition systems." May 12, 2023. <https://defence-industry.eu/senop-enhances-finlands-defence-capabilities-with-state-of-the-art-target-acquisition-systems/>.
- Defence Security Asia. "Several Soon-to-be-Acquired 155mm SP Howitzer Will Be Deployed to Sabah - M'sia Defence Minister." December 11, 2023. [https://defencesecurityasia.com/en/howitzer-malaysia-turkey-sabah/#google\\_vignette](https://defencesecurityasia.com/en/howitzer-malaysia-turkey-sabah/#google_vignette).
- Defence White Paper. "Stronger Netherlands, Safer Europe." 2022. <https://english.defensie.nl/binaries/defence/documenten/publications/2022/07/19/defence-white-paper-2022/Defence+White+Paper+2022.pdf>.
- Defense Brief. "Romania receives HIMARS rocket launcher systems from the US." February 26, 2021. <https://defbrief.com/2021/02/26/romania-receives-himars-rocket-launcher-systems-from-the-us/>.
- Defense Security Cooperation Agency. "FINLAND - GUIDED MULTIPLE LAUNCH ROCKET SYSTEMS (GMLRS)." November 02, 2022. <https://www.dsca.mil/press-media/major-arms-sales/finland-guided-multiple-launch-rocket-systems-gmlrs>.
- Defense Security Cooperation Agency. "Morocco of High Mobility Artillery Rocket Systems (HIMARS)." April 11, 2023. <https://www.dsca.mil/press-media/major-arms-sales/morocco-high-mobility-artillery-rocket-systems-himars>.
- Defensemirror.com. "Finland to Buy 155mm Projectile Shells from Nammo." August 19, 2022. [https://www.defensemirror.com/news/32594/Finland\\_to\\_Buy\\_155mm\\_Projectile\\_Shells\\_from\\_Nammo#.Ygua8HZBzEY](https://www.defensemirror.com/news/32594/Finland_to_Buy_155mm_Projectile_Shells_from_Nammo#.Ygua8HZBzEY).
- Economic Times. "Army moves over Rs 6,500 cr deal to Defence Ministry for procurement of 400 howitzers from 'desi' firms." September 28, 2023. <https://economictimes.indiatimes.com/news/defence/army-moves-over-rs-6500-cr-deal-to-defence-ministry-for-procurement-of-400-howitzers-from-desi-firms/articleshow/104025122.cms>.

35. EDR Magazine. "Bundeswehr contracts with Rheinmetall for several hundred thousand artillery shells; order worth around €1.3 billion." July 18, 2023. <https://www.edrmagazine.eu/bundeswehr-contracts-with-rheinmetall-for-several-hundred-thousand-artillery-shells-order-worth-around-e1-3-billion>.
36. Egypt Defence Expo. "Egypt begins modernizing and upgrading its aging artillery." June 17, 2023. <https://www.egyptdefenceexpo.com/news/egypt-begins-modernizing-upgrading-aging-artillery>.
37. Elbit Systems. "Elbit Systems' UK Subsidiary Awarded \$137 Million Contract to Supply the Future Target Acquisition Solution for Soldiers of the British Armed Forces." January 21, 2021. <https://elbitsystems.com/pr-new/elbit-systems-uk-subsidiary-awarded-137-million-contract-to-supply-the-future-target-acquisition-solution-for-soldiers-of-the-british-armed-forces/>
38. Elbit Systems. "Elbit Systems Awarded \$305 Million Contract to Supply PULS Rocket Artillery Systems to the Royal Netherlands Army." May 18, 2023. <https://elbitsystems.com/pr-new/elbit-systems-awarded-305-million-contract-to-supply-puls-rocket-artillery-systems-to-the-royal-netherlands-army/>.
39. Fiorenza, Nicholas. "Poland signs Gladius 2 contract with WB Group." Janes. September 12, 2022. <https://www.janes.com/defence-news/news-detail/poland-signs-gladius-2-contract-with-wb-group>.
40. Fiorenza, Nicholas. "France awards Larinae loitering munition development contract." Janes. June 20, 2023. <https://www.janes.com/defence-news/news-detail/france-awards-larinae-loitering-munition-development-contract>
41. Fiorenza, Nicholas. "Ukraine conflict: Germany orders 10 PzH 2000 SPHs to replace those sent to Kyiv." Janes. March 31, 2023. <https://www.janes.com/defence-news/news-detail/ukraine-conflict-germany-orders-10-pzh-2000-sphs-to-replace-those-sent-to-kyiv>.
42. Fiorenza, Nicholas. "Finland exercises option for five more K9 SPHs." Janes. October 25, 2021. <https://www.janes.com/defence-news/news-detail/finland-exercises-option-for-five-more-k9-sphs>.
43. Fiorenza, Nicholas. "Eurosatory 2022: Swedish FMV and BAE Systems Bofors sign LOI to establish additional Archer battalion." Janes. June 16, 2022. <https://www.janes.com/defence-news/news-detail/eurosatory-2022-swedish-fmv-and-bae-systems-bofors-sign-loi-to-establish-additional-archer-battalion>.
44. Fiorenza, Nicholas. "DSEI 2023: Sweden orders 48 more Archer SPHs as it delivers others to UK." Janes. September 18, 2023. <https://www.janes.com/defence-news/news-detail/dsei-2023-sweden-orders-48-more-archer-sphs-as-it-delivers-others-to-uk>.
45. Gady, Franz-Stefan. "India's Defense Ministry Clears Production of 114 Long-Range Artillery Gun Systems." The Diplomat. February 20, 2019. <https://thediplomat.com/2019/02/indias-defense-ministry-clears-production-of-114-long-range-artillery-gun-systems/>.
46. Hambling, David. "The U.S. Army Won't Buy Any More Switchblade 300 Kamikaze Drones." 19fortyfive. July 23, 2023. <https://www.19fortyfive.com/2023/07/the-u-s-army-wont-buy-anymore-switchblade-300-kamikaze-drones/>
47. Hoffman, Mary-Louise. "Raytheon Unit to Support Army Target Acquisition System." ExecutiveBiz. August 16, 2022. <https://executivebiz.com/2022/08/raytheon-unit-to-support-army-target-acquisition-system/>.
48. IANS. "China overhauls Pakistan firepower, to supply 236 howitzer guns." The New Indian Express. December 21, 2019. <https://www.newindianexpress.com/world/2019/dec/21/china-overhauls-pakistan-firepower-to-supply-236-howitzer-guns-2079249.html>.
49. idrw.org. "Indian Army Placed order for Sharang Artillery Gun." August 16, 2023. <https://idrw.org/indian-army-placed-order-for-sharang-artillery-gun/>.
50. Kajaal, Kapil. "Indian Army orders 100 additional K9 howitzers." Janes. February 20, 2023. <https://www.janes.com/defence-news/news-detail/indian-army-orders-100-additional-k9-howitzers>.
51. Kajaal, Kapil. "South Korea approves performance upgrades for K9 howitzers." Janes. June 27, 2023. <https://www.janes.com/defence-news/news-detail/south-korea-approves-performance-upgrades-for-k9-howitzers>.
52. Kim, Brian and Chuter, Andrew. "SKorea's Hanwha pitches K9 howitzer for British mobile fires program." Defense News. June 03, 2021. <https://www.defensenews.com/industry/2021/06/02/skoreas-hanwha-pitches-k9-howitzer-for-british-mobile-fires-program/>.
53. Kim, Brian and Helou, Agnes. "Egypt inks \$1.7 billion deal for K9 howitzers from South Korea." Defense News. February 01, 2022. <https://www.defensenews.com/land/2022/02/01/egypt-inks-1-7-billion-deal-for-k9-howitzers-from-south-korea/>.
54. Kumar, Anish. "Army wants to buy 10 aerial targeting systems, 120 loiter munitions for border deployment." Asianet News. November 03, 2022. <https://newsable.asianetnews.com/india-defence/army-wants-to-buy-10-aerial-targeting-systems-120-loiter-munitions-for-border-deployment-rkrz2l>.
55. Lye, Harry. "Sweden buys new amphibious artillery platforms." Shephard Media. May 23, 2023. <https://www.shephardmedia.com/news/naval-warfare/sweden-buys-new-amphibious-artillery-platforms/>.
56. Majumdar, Oishee and Parakala, Akshara. "Aero India 2023: IAF to receive 100 loitering munitions from TASL." Janes. February 16, 2023. <https://www.janes.com/defence-news/news-detail/aero-india-2023-iaf-to-receive-100-loitering-munitions-from-tasl>.
57. Martin, Tim. "Spurred by Russia, Germany rolls out 3-year plan to fully equip all armed forces personnel." Breaking Defence. January 27, 2023. <https://breakingdefense.com/2023/01/spurred-by-russia-germany-rolls-out-3-year-plan-to-fully-equip-all-armed-forces-personnel/>.
58. Martin, Tim. "Norway bulks up artillery with new K9 howitzer agreement, tank contract set for year end." Breaking Defence. November 07, 2022. <https://breakingdefense.com/2022/11/norway-bulks-up-artillery-with-new-k9-howitzer-agreement-tank-contract-set-for-year-end/>.
59. McBride, Courtney. "Army awards contract for handheld target acquisition device." Inside Defense. September 28, 2016. <https://insidedefense.com/daily-news/army-awards-contract-handheld-target-acquisition-device>.
60. Militaryni. "Finland buys 38 used K9 self-propelled howitzers." November 19, 2022. <https://mil.in.ua/en/news/finland-buys-38-used-k9-self-propelled-howitzers/>.
61. Militaryni. "Finland increases its purchases of 155 mm artillery shells." March 30, 2023. <https://mil.in.ua/en/news/finland-increases-its-purchases-of-155-mm-artillery-shells/>.
62. Military Africa. "Loitering munitions offers enhanced strike capabilities to African forces." May 04, 2023. <https://www.military.africa/2023/05/loitering-munitions-offers-enhanced-strike-capabilities-to-african-forces/>.
63. Militaryleak. "German Army Upgrades MARS II/MLRS-E with New Fire Control Systems and GMLRS." July 13, 2021. <https://militaryleak.com/2021/07/13/german-army-upgrades-mars-ii-mlrs-e-with-new-fire-control-systems-and-gmlrs/>.
64. Militaryleak. "Indonesia Completes Development of R-Han 122B Multiple Launch Rocket System (MLRS)." November 01, 2023. <https://militaryleak.com/2023/11/01/indonesia-completes-development-of-r-han-122b-multiple-launch-rocket-system-mlrs/>.
65. Militaryleak. "South Korea Approves Plan to Upgrade K9 Self-propelled Howitzers." July 03, 2023. <https://militaryleak.com/2023/07/03/south-korea-approves-plan-to-upgrade-k9-self-propelled-howitzers/#>.
66. NDTV. "As India Ups Border Surveillance, Army's Request On Drone Detection Systems." November 22, 2022. <https://www.ndtv.com/india-news/as-india-ups-border-surveillance-armys-request-on-drone-detection-systems-3544494>.
67. Netherlands Ministry of Defence. "Defense Stocks 1.5 Billion Euros Worth of Ammunition." Defense Aerospace. April 19, 2023. <https://www.defense-aerospace.com/netherlands-to-invest-e1-5-billion-to-replenish-ammunition-stocks/>.
68. Nichols, Martin. "Northrop Secures \$252M USMC Contract to Produce Handheld Target Acquisition Tech." Govconwire. February 18, 2022. <https://www.govconwire.com/2022/02/northrop-secures-252m-usmc-contract-to-produce-handheld-target-acquisition-tech/>.
69. Nielsen, Thomas Lauge. "France Issues Tender for Backpackable Loitering Munitions." European Security & Defence. June 12, 2023. <https://euro-sd.com/2023/06/news/32212/france-issues-tender-for-backpackable-loitering-munitions/>.
70. Norwegian Ministry of Defence. "Future Acquisitions For the Norwegian Defence Sector 2021-2028." April 2021. [https://www.regjeringen.no/contentassets/09d83a5cbef4df6b8064e6ca871accbb/faf-2021-2028-engelsk-versjon-\\_.pdf](https://www.regjeringen.no/contentassets/09d83a5cbef4df6b8064e6ca871accbb/faf-2021-2028-engelsk-versjon-_.pdf).
71. Pereira, Flavia Camargos. "Finland and Estonia to order additional K9s." Shephard Media. November 01, 2021. <https://www.shephardmedia.com/news/landwarfareintl/finland-will-order-10-additional-k9-self-propelled/>.
72. Reuters. "Germany OKs buying howitzers to help replace arms rushed to Ukraine." March 29, 2023. <https://www.reuters.com/world/europe/germany-oks-buying-howitzers-help-replace-arms-rushed-ukraine-2023-03-29/>.
73. Reuters. "Dutch government to spend billions on military procurement." Devdiscourse. October 19, 2022. <https://www.devdiscourse.com/article/technology/2219626-dutch-government-to-spend-billions-on-military-procurement>.

74. Saw, David. "Solving the British Artillery Capability Gap – the Mobile Fires Platform." *European Security & Defence*. October 16, 2023. <https://euro-sd.com/2023/10/articles/34021/solving-the-british-artillery-capability-gap-the-mobile-fires-platform/>
75. Seiden, Daniel. "Peraton Keeps \$25 Million Army Order for Target Acquisition Tech." *Bloomberg*. August 16, 2023. <https://news.bloomberglaw.com/federal-contracting/peraton-keeps-25-million-army-order-for-target-acquisition-tech>.
76. Sinha, Sahil. "Army to boost firepower with 200 mounted howitzers under 'Make in India' push." *India Today*. November 27, 2023. <https://www.indiatoday.in/india/story/india-army-mounted-howitzers-make-in-india-initiative-defence-ministry-2468262-2023-11-27>.
77. Skove, Sam. "Army orders loitering munition for testing as soldier-borne tank-killer." *Defense One*. October 11, 2023. <https://www.defenseone.com/defense-systems/2023/10/army-orders-loitering-munition-testing-soldier-borne-tank-killer/391136/>.
78. The Hindu Group. "Germany to produce ammo for air defence guns sent to Ukraine." February 14, 2023. <https://www.thehindu.com/news/international/germany-to-produce-ammo-for-air-defence-guns-sent-to-ukraine/article66508074.ece>.
79. The Shephard News Team. "Hanwha sends first K9 howitzers to Poland." October 19, 2022. <https://www.shephardmedia.com/news/landwarfareintl/hanwha-sends-first-k9-howitzers-to-poland/>.
80. The Shephard News Team. "Nexter contracted for an additional 18 Caesar artillery pieces." July 29, 2022. <https://www.shephardmedia.com/news/landwarfareintl/nexter-contracted-for-an-additional-18-caesar-artillery-pieces/>.
81. The Shephard News Team. "Israel Aerospace Industries signs two loitering munitions deals." November 23, 2023. <https://www.shephardmedia.com/news/landwarfareintl/israel-aerospace-industries-signs-two-loitering-munitions-deals/>.
82. The Shephard News Team. "Finland approves acquisition of extended-range GMLRS rockets." February 14, 2022. <https://www.shephardmedia.com/news/landwarfareintl/finland-approves-acquisition-of-extended-range-gmlr/>.
83. The Shephard News Team. "Upgraded MLRS set for Finland after US State Department approves \$395 million deal." August 02, 2023. <https://www.shephardmedia.com/news/landwarfareintl/upgraded-mlrs-set-for-finland-after-us-state-department-approves-395-million-deal/>.
84. Thomas, Richard. "UK dips into booming global artillery market with M270A2 upgrade." *Army Technology*. October 12, 2022. <https://www.army-technology.com/features/uk-dips-into-booming-global-artillery-market-with-m270a2-upgrade/>.
85. Thomas, Richard. "UK seeking to double M270 MLRS fleet." *Army Technology*. September 22, 2022. <https://www.army-technology.com/features/uk-seeking-to-double-m270-mlrs-fleet/>.
86. TurDef. "The Netherlands Gets MQ-9A UAV." June 17, 2023. <https://www.turdef.com/article/the-netherlands-gets-mq-9-a-uav>.
87. Under Secretary of Defense (Comptroller). "Department of Defense Fiscal Year (FY) 2024 Budget Estimates, Justification Book Volume 1 of 1 Missile Procurement, Army." March 2023. <https://www.asafm.army.mil/Portals/72/Documents/BudgetMaterial/2024/Base%20Budget/Procurement/Missile%20Procurement%20Army.pdf>.
88. Under Secretary of Defense (Comptroller). "Department of Defense Fiscal Year (FY) 2024 Budget Estimates, Justification Book Volume 1 of 1 Procurement of W&TCV, Army." March 2023. <https://www.asafm.army.mil/Portals/72/Documents/BudgetMaterial/2024/Base%20Budget/Procurement/Procurement%20of%20Weapons%20and%20Tracked%20Combat%20Vehicles.pdf>.
89. Under Secretary of Defense (Comptroller). "Department of Defense Fiscal Year (FY) 2024 Budget Estimates, Justification Book Volume 1 of 1 Procurement of Ammunition, Army." March 2023. <https://www.asafm.army.mil/Portals/72/Documents/BudgetMaterial/2024/Base%20Budget/Procurement/Procurement%20of%20Ammunition%20Army.pdf>.
90. Under Secretary of Defense (Comptroller). "Department of Defense Fiscal Year (FY) 2024 Budget Estimates, Justification Book Volume 1b of 1 Research, Development, Test & Evaluation, Army RDT&E – Volume I, Budget Activity 2." March 2023. <https://www.asafm.army.mil/Portals/72/Documents/BudgetMaterial/2024/Base%20Budget/rdte/RDTE-Vol%201-Budget%20Activity%202.pdf>.
91. Under Secretary of Defense (Comptroller). "Department of Defense Fiscal Year (FY) 2024 Budget Estimates, Justification Book Volume 1c of 1 Research, Development, Test & Evaluation, Army RDT&E – Volume I, Budget Activity 3." March 2023. <https://www.asafm.army.mil/Portals/72/Documents/BudgetMaterial/2024/Base%20Budget/rdte/RDTE-Vol%201-Budget%20Activity%203.pdf>.
92. Under Secretary of Defense (Comptroller). "Department of Defense Fiscal Year (FY) 2024 Budget Estimates, Justification Book Volume 2a of 2 Research, Development, Test & Evaluation, Army RDT&E – Volume II, Budget Activity 4A." March 2023. <https://www.asafm.army.mil/Portals/72/Documents/BudgetMaterial/2024/Base%20Budget/rdte/RDTE-Vol%202-Budget%20Activity%204A.pdf>.
93. Under Secretary of Defense (Comptroller). "Department of Defense Fiscal Year (FY) 2024 Budget Estimates, Justification Book Volume 3b of 3 Research, Development, Test & Evaluation, Army RDT&E – Volume II, Budget Activity 5B." March 2023. <https://www.asafm.army.mil/Portals/72/Documents/BudgetMaterial/2024/Base%20Budget/rdte/RDTE-Vol%202-Budget%20Activity%205B.pdf>.
94. Under Secretary of Defense (Comptroller). "Department of Defense Fiscal Year (FY) 2024 Budget Estimates, Justification Book Volume 3c of 3 Research, Development, Test & Evaluation, Army RDT&E – Volume II, Budget Activity 5C." March 2023. <https://www.asafm.army.mil/Portals/72/Documents/BudgetMaterial/2024/Base%20Budget/rdte/RDTE-Vol%202-Budget%20Activity%205C.pdf>.
95. Under Secretary of Defense (Comptroller). "Department of Defense Fiscal Year (FY) 2024 Budget Estimates, Justification Book Volume 4b of 4 Research, Development, Test & Evaluation, Army RDT&E – Volume III, Budget Activity 7." March 2023. <https://www.asafm.army.mil/Portals/72/Documents/BudgetMaterial/2024/Base%20Budget/rdte/RDTE-Vol%203-Budget%20Activity%207.pdf>.
96. Under Secretary of Defense (Comptroller). "Department of Defense Fiscal Year (FY) 2024 Budget Estimates, Justification Book Volume 1 of 1 Procurement, Marine Corps." March 2023. [https://www.secnv.navy.mil/fmc/fmb/Documents/24pres/PMC\\_Book.pdf](https://www.secnv.navy.mil/fmc/fmb/Documents/24pres/PMC_Book.pdf).
97. Under Secretary of Defense (Comptroller). "Department of Defense Fiscal Year (FY) 2024 Budget Estimates, Justification Book Volume 1 of 1 Procurement of Ammo, Navy & MC." March 2023. [https://www.secnv.navy.mil/fmc/fmb/Documents/24pres/PANMC\\_Book.pdf](https://www.secnv.navy.mil/fmc/fmb/Documents/24pres/PANMC_Book.pdf).
98. Unmanned Network. "Aeronautics announces the signing of a contract with the Finnish Defense Forces for mid-life upgrade of its Orbiter 2 Mini UAS array." April 03, 2023. <https://unmanned-network.com/aeronautics-announces-signing-of-a-contract-with-the-finnish-defense-forces-for-mid-life-upgrade-its-orbiter-2-mini-uas-array/>.
99. US Department of Defense. "Lockheed Martin Wins \$199 Million for MLRS Munitions for Finland and US Army." *Defense Aerospace*. November 27, 2023. <https://www.defense-aerospace.com/lockheed-martin-wins-199-million-for-mlrs-munitions-for-finland-and-us-army/>.
100. WB Group. "Poland orders Warmate loitering munitions." April 29, 2022. <https://www.wbgroup.pl/en/aktualnosci/poland-orders-warmate-loitering-munitions/>.
101. Wong, Kelvin. "Singapore outlines next-generation armed forces in latest transformation roadmap." *Janes*. March 05, 2019. <https://www.janes.com/defence-news/news-detail/singapore-outlines-next-generation-armed-forces-in-latest-transformation-roadmap>.
102. World News. "US Approves \$10 Billion Sale Of Himars Rocket Launchers To Poland." *Ndtv World*. February 08, 2023. <https://www.ndtv.com/world-news/us-approves-10-billion-sale-of-himars-rocket-launchers-to-poland-3762690>.

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## DELIVERING FIRES IN THE MULTI-DOMAIN BATTLESPACE



### SPEAKERS INCLUDE:



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Inspector of the Artillery Corps,  
*Italian Army*



**Brigadier General Yves Gächter,**  
Commander of the Artillery and Armoured Forces Training Command,  
*Swiss Army*



**Brigadier General Jonas Lotsne,**  
Director Land Systems,  
*Swedish Defence Materiel Administration (FMV)*



**Colonel Cyril Lordanow,**  
Chief Of the Artillery Office Command,  
*French Army*



**Colonel Olaf Tuneke,**  
General of the German Artillery & Commandant of the German Artillery School,  
*German Army*



**Colonel Sunghyun Yoon,**  
Team Leader Artillery Program Team,  
*DAPA*



**Colonel Stephan Sjöberg,**  
Chief of Artillery,  
*Swedish Army*



**Colonel Kjartan Søyland,**  
Head of Department Artillery and Air Defense,  
*Norwegian Armed Forces*



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Chief of Artillery,  
*Army Of the Czech Republic*



**Colonel Roman Bobal',**  
Chief of Artillery,  
*Slovak Armed Forces*



**Colonel Michael A. Villumsen,**  
Commander Danish Artillery Regiment,  
*Danish Army*



**Lieutenant Colonel David Manunta,**  
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**Lieutenant Colonel Allan Raidma,**  
Artillery Battalion Commander,  
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**Lieutenant Colonel Erik Verstraelen,**  
Commanding Officer Artillery Battalion,  
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**Lieutenant Colonel Dejan Šibilja,**  
Artillery Capabilities Development Officer,  
*Slovenian Army*  
(subject to final confirmation)



**Lieutenant Colonel Gregoire Solioz,**  
Commander, Testing, Tank and Artillery Command,  
*Swiss Army*



**Tim De Zitter,**  
Lifecycle manager Land Combat Missiles,  
*Belgian MoD*



**Tim Ingersoll,**  
Chief of Section,  
*NATO Support and Procurement Agency (NSPA)*



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