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Multiple Launch Rocket Systems

Europe's Long-standing and Enduring Dependence?

Security Studies
Center

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Abstract

The war in Ukraine has underlined the importance of multiple launch rocket systems (MLRS) in modern conflict, especially a war without clear air superiority and hence a reduced potential for air-launched deep strike. In 2022, the European MLRS fleet was split between a variety of Western platforms developed at the end of the Cold War and specialized in precision strikes. Alongside these were a larger number of Soviet-era legacy systems intended for saturation fire. As these had seen limited use over the previous thirty years of deployed and peacekeeping conflicts, European MLRS capabilities were massively reduced, with most armies keeping minimal capabilities or completely retiring the systems. Most modernization programs were intended to increase their capability, but also to extend their service life, in order to avoid a costly replacement program.

As the few modern MLRS delivered to the Ukrainian armed forces proved themselves to be highly efficient, European armies launched a major rearmament effort during the first half of 2022 in order to restore this neglected capability. As no local solution existed, most armies opted for off-the-shelf purchases of extra-European systems, with limited options: US M142 HIMARS (119 units ordered in January 2026); Israeli PULS (74 units); or South Korean K239 Chunmoo (310 units); three platforms with similar performances and costs. Germany also chose to develop two competing alternatives, in cooperation with extra-European partners: Lockheed Martin and Rheinmetall on GMARS, facing Elbit and KNDS Deutschland on EuroPuls. France chose to create its own solution in order to preserve sovereignty over the production and use of its ammunition, through the FLP-T program.

However, this latter long-term project has required an interim purchase in order to facilitate a short-term replacement of the existing MLRS, the service life of which will end by 2027. Besides the three existing options listed above, it appears that France is willing to purchase an Indian MLRS, the Pinaka, potentially introducing a fourth platform to the European market. This choice is somewhat strange, as the Pinaka is a less capable MLRS than the others in terms of range and accuracy. The French Army specifies a required strike capability of up to 150 km, while the Pinaka can barely reach 120 km with ammunition that is still under development. Besides the much-needed European/NATO interoperability aspect, such a choice would strongly undermine the French position on purchasing European weapons for European armies. Though there is yet no new fully European MLRS, introducing another wholly foreign platform with lower capability would certainly weaken French military credibility.

Résumé

Le conflit en Ukraine a souligné le rôle des lance-roquettes multiples (LRM) dans un conflit moderne, notamment en l'absence de supériorité aérienne empêchant les frappes dans la profondeur air-sol. De son côté, le parc de LRM européen se partage entre une minorité de plateformes occidentales à longue portée acquises à la fin de la guerre froide et une majorité de plateformes de conception soviétique ou post-soviétique axées sur la saturation à courte portée. Peu sollicité au cours des trois décennies d'opérations extérieures et de maintien de la paix, le parc européen de LRM s'est largement réduit, chaque armée n'en conservant qu'une capacité échantillonaire en choisissant de l'abandonner. Les programmes de modernisation réalisés visaient ainsi autant à accroître leurs capacités qu'à prolonger leur durée de service pour repousser un programme de remplacement coûteux.

L'efficacité des LRM livrés aux forces ukrainiennes à partir du printemps 2022 amorce cependant une importante dynamique de réarmement sur ce segment négligé. Faute de solution locale, la plupart des armées ont lancé l'acquisition sur étagère de systèmes extra-européens, le choix étant limité au M142 HIMARS américain (119 unités), au PULS israélien (74 unités) et au K239 Chunmoo (310 unités) sud-coréen, trois plateformes similaires dans leurs performances et coûts. En outre, l'industrie allemande mène deux projets concurrents en coopération avec des acteurs extra-européens pour un développement à moyen terme : le GMARS (Lockheed Martin et Rheinmetall) et l'EuroPuls (KNDS Deutschland et Elbit). La France a choisi de développer une solution souveraine afin de conserver la pleine maîtrise de la production et de l'usage de ses munitions via le programme FLP-T.

Ce projet de long terme nécessite cependant l'acquisition d'une solution intermédiaire, le parc existant n'étant plus soutenable au-delà de 2027. Outre les trois LRM acquis par les armées européennes, la France semble s'orienter vers le Pinaka indien, introduisant potentiellement une quatrième plateforme extra-européenne sur un marché continental déjà bien pourvu. Ce choix interroge d'autant plus que le LRM indien reste bien moins performant que les autres systèmes disponibles, en termes de portée comme de précision. Alors que l'armée de Terre estime son besoin de porter les feux à 150 kilomètres (km) de portée, le Pinaka dispose seulement d'une munition encore en phase de développement ne portant qu'à 120 km.

Au-delà des enjeux d'interopérabilité, un tel choix saperait également la crédibilité du discours français promouvant l'acquisition d'armement européen. S'il n'existe pas de LRM européen en tant que tel, introduire un quatrième système moins performant que ceux déjà disponibles en Europe ne manquerait pas d'amoindrir la crédibilité française.

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Introduction

Western multiple launch rocket systems (MLRS) were delivered to Ukraine early in the summer of 2022. They proved decisive in the conflict, enabling Ukrainian forces to engage the Russian military apparatus during the reconquest operations of autumn 2022. These successes brought media attention to systems rarely featured in Western inventories and triggered a race among European countries to renovate and replace a capability segment that had fallen into neglect.

In 2022, Europe's MLRS fleet consisted mainly of platforms inherited or derived from weapon systems used by Warsaw Pact armies, such as the BM-21 Grad of the 1960s (whose main 122-millimeter (mm) caliber was designed for saturation strikes), alongside a minority of systems of US origin derived from the M270 MLRS program of the 1980s. Although these platforms have now seen forty to fifty years of service and undergone several modernization cycles, European armies long ignored the question of their replacement—until the war in Ukraine brought the issue to a head. The European defense industry as a whole, however, lacks experience in this segment. Saturation systems are relatively well mastered, especially by the former Warsaw Pact countries, but long-range precision surface-to-surface munitions remain largely absent from the continent's industrial catalogs or depend on restrictive external licenses.

France is no exception. Its MLRS capability has been reduced to a handful of aging platforms with limited availability, and whose munitions depend on US licenses. Paris recently decided to begin development of a new national system to ensure sovereign control over its ammunition supply, which is the only truly strategic component of an MLRS. Developing a national system will be a protracted process, however, and it may leave France isolated within Europe, since most other European armies have opted for quick, off-the-shelf acquisitions of extra-European platforms.

Strategic-level systems with a range exceeding 500 kilometers (km) will not be addressed in this note.

A European capability undergoing modernization

The European MLRS fleet had little operational utility following the end of the Cold War. It was made up largely of aging systems and received only limited attention and investment. However, MLRS have proved important in the war in Ukraine, prompting European nations to launch a massive investment drive focusing on foreign third-generation platforms.

Principles and technology

A rocket launcher system consists of four main components:

- a carrier platform: a wheeled (or occasionally tracked) vehicle, often accompanied by a similar resupply vehicle;
- a launcher pod, which is often traversable;
- a given number of munitions of varying ranges, calibers, and effects;
- a fire control system, used to receive target coordinates, adjust the launcher's elevation and azimuth, and guide the munitions.

While the carrier and launcher pod are relatively simple to design, the munitions require a higher degree of technical sophistication. Basic, short-range 122 mm or 130 mm high-explosive rockets are inexpensive munitions designed for area saturation rather than precision, much like the Soviet BM-13 *Katyusha* of the Second World War. A single salvo from a Soviet BM-21 *Grad* MLRS carrying 40 rockets can saturate more than a hectare of terrain in a single salvo from a distance of 20 to 30 km.

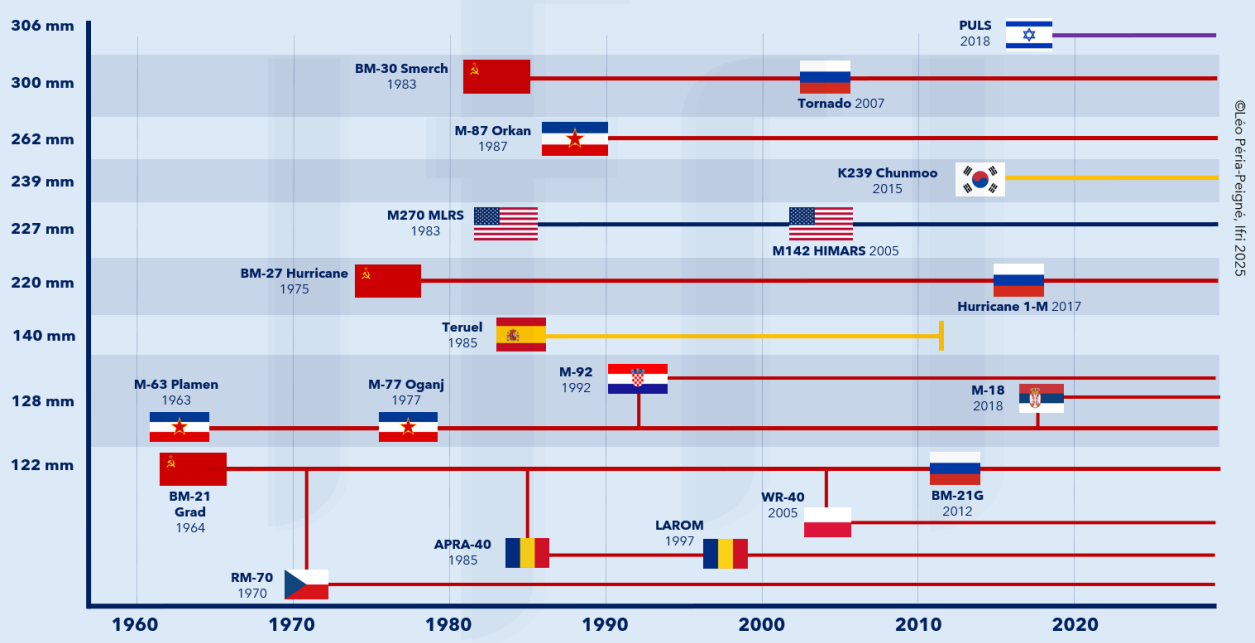
Conversely, more complex, expensive munitions, such as ballistic or quasi-ballistic missiles like the US ATACMS (Army Tactical Missile System), combine far superior precision (on the order of meters) with a range that can exceed 300 km. Rockets and missiles are highly modular, which allows for a range of desired effects, such as the scattering of anti-personnel or anti-tank mines (a capability widely used in Ukraine) or the use of cluster munitions to further enhance the saturation effect of a single salvo.[1] Specialized missiles can also be employed to engage specific targets, such as fortified positions or naval vessels, as illustrated by the CTM-ASBM missile developed by South Korea.[2]

1. L. Péria-Peigné, "Armes à sous-munitions et mines antipersonnel. La maîtrise des armements face aux menaces existentielles", *Briefings de l'Ifri*, Ifri, May 2025, available at: www.ifri.org.
2. "Hanwha Aerospace Unveils Chunmoo MRLS' Anti-Ship Ballistic Missile Capability at ADAS 2024", *Army Recognition*, August 27, 2025, available at: www.armyrecognition.com.

Such versatility is not universal, however. The munitions families of older systems in particular tend to be more limited: Systems designed for short-range saturation can rarely employ long-range precision munitions, and vice versa. That said, new generations of platforms appear to be bridging the gap between saturation and precision with the development of more varied and versatile families of munitions. Medium-sized loitering munitions are being integrated into certain systems, which will allow MLRS to deploy drone swarms on the battlefield in the future: The drones will be launched like rockets and then deployed in flight.

The fire control system is the other complex component of modern MLRS. While systems from the 1960s relied on manual ballistic calculations that were often approximate, digitization has made it possible to develop automated fire control systems which, in addition to cutting the time between receiving coordinates and firing, also optimize precision.

Figure I-1: Genealogy of MLRS models in Europe



Source: Military Balance.

MLRS can be categorized into three main generations:

- The **first generation** covers early systems, from the 1930s to the 1960s, such as the BM-13 Katyusha, the iconic MLRS of the Second World War. These were very rudimentary systems designed for saturation strikes at ranges of less than 10 km. Its successor, the BM-21 Grad and its many derivatives, remains one of the most commonly used systems in the world. For many years, these systems had no equivalent within the North Atlantic Treaty Organization (NATO), even though they constituted a significant proportion of Warsaw Pact artillery.

- The **second generation** covers the development of longer-range rockets with significantly improved precision, which allowed MLRS to be used in a greater variety of ways. In the Soviet camp, the BM-27 *Uragan* (1975) and BM-30 *Smerch* (1983) complemented the BM-21 with more powerful 220 mm and 300 mm munitions. The *Smerch* could strike up to 90 or even 120 km, beyond the range of Western counter-battery capabilities. Starting in the late 1970s, Western forces, recognizing the need to improve the overall range of their artillery to counter the threat of Soviet launchers, began to take a greater interest in MLRS.

  The result was the Multiple Launch Rocket System program, which brought together the United States, Germany, France, and the United Kingdom (soon joined by Italy) to develop the M270, a 227 mm tracked MLRS designed for saturation strikes at a range of 40 km using cluster munition rockets. The M270 entered service in 1983; it was later modified after the end of the Cold War to meet new challenges. The signing of the Oslo Convention banning cluster munitions and the increase in stabilization operations in the 1990s and 2000s led the M26 rockets (the M270's saturation munitions) to be eliminated in favor of the M31, a unitary warhead precision rocket with a range of 80 km. This development transformed French multiple rocket launchers into "Unitary Rocket Launchers" (*Lance-roquettes unitaires*, LRUs). Some European M270s, notably Greece's and Turkey's, can use the MGM-140 ATACMS tactical missile, which has a range of 300 km.[3]

- The **third generation**, developed starting in the mid-2000s, combines saturation and precision. South Korea's K239 *Chunmoo* and Israel's PULS, which entered service in 2015 and 2020, respectively, can deploy a wider variety of munitions than their predecessors (see table below).

  The M142 High Mobility Artillery Rocket System (HIMARS), developed in the United States beginning in 2005, is more an evolution of the M270 rather than a true generational shift: It mounts the M270's munitions on a lighter wheeled chassis. In Russia, the trend has been to standardize platforms and launcher pods to create versatile systems that can fire 122, 220, and 300 mm munitions interchangeably. In the medium term, the *Tornado* and *Uragan-1M* are slated to gradually replace the *Smerch* and *Uragan* and field modern rockets, but only a few units are in service as of 2025.[4]

3. P. Langloit, "La famille M-270/M-142, levier de puissance ukrainien", *Défense & Sécurité Internationale*, No. 161, September-October 2022.
4. "Artillerie russe: Kaboom? Yes Rico, Kaboom!", November 19, 2025, available at: https://redsamovar.com.

Table I-1: Three generations of MLRS

Gen.	Effect	Range	Period	Example	Quantity
1	Short-range saturation	35 km	1960'	BM-21 *Grad*	130
1+	Short-range saturation	45 km	1970'	RM-70	589
2	Saturation, then medium-range precision	40–80 km	1980'	M270 MLRS	208
2+	Medium- and long-range precision	80–300 km	2000'	M142 HIMARS	169
3	Saturation and precision at all ranges	35–500 km	2010'	K239 *Chunmoo*	375

Within a battle corps, an MLRS unit enables saturation and precision strikes both on the front line and in the enemy's depth. Its purpose is mainly to disorganize rear areas by disrupting logistics and command structures, as well as to strike enemy artillery in counter-battery missions, thereby allowing allied maneuver forces to advance. Modern MLRS neutralize high-value targets such as command posts or logistics centers, as well as air defense systems, which have become difficult for aircraft and drones to destroy alone. MLRS thus contributes to gaining air superiority alongside air assets. The development of low-yield but highly precise munitions has made it possible to use MLRS in urban or populated environments while minimizing civilian casualties.

European fleets at a crossroads

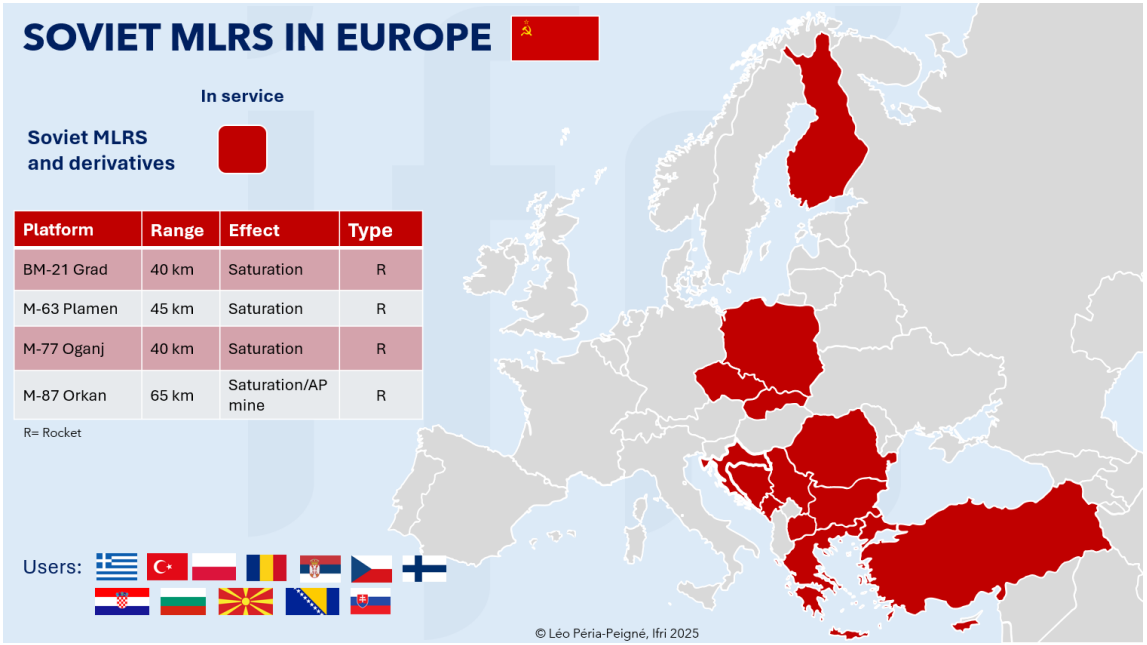
Western MLRS were designed to confront Warsaw Pact armies, but they were not actually delivered until after the collapse of the USSR, just as armies were reorienting toward stabilization missions abroad. European tube artillery fleets were rapidly drawn down over the following three decades, but MLRS fleets were cut even more sharply, with some armies, including those of the Netherlands and Spain, abandoning the capability entirely. The French fleet was reduced from 53 M270 MLRS in 1996 to less than ten M270s (LRU) in 2026, and less than half of these, reportedly, are operational.[5] Former Soviet Bloc European countries, whose fleets consist of more rudimentary systems, were drawn down to lesser degrees: Poland's fleet, for instance, was reduced from 258 platforms to 150 over the same period (excluding systems acquired since 2022).[6]

In a period dedicated to peacekeeping operations against asymmetric enemies, MLRS were considered largely irrelevant, and most European armies settled for more or less ambitious modernization programs in order to maintain a token capability and avoid a complete capability gap. Most of these modernizations focused on fire control systems (with a view toward shifting the

5. Interviews conducted with French and foreign military and industrial actors, winter 2025.
6. *Military Balance 1996*, IISS.

emphasis from saturation to precision) or chassis modifications.[7] Operational deployments remained rare. France deployed a rotation of M270 LRUs to Mali in 2015 for targeting operations, but it did not do so again.[8] In Central and Eastern Europe, the BM-21 and its many local derivatives underwent a series of incremental changes; these were intended mainly for export or to integrate higher-performance 122 mm rockets, not to develop new platforms.

Map I-1: Soviet MLRS in Europe



Source: Military Balance 2025.

On the eve of the war in Ukraine, the European MLRS fleet consisted essentially of a minority of M270s of varying degrees of modernization and a majority of systems derived from Soviet-era MLRS. These platforms could be considered aging, and the general trend was to modernize them or extend their lifespan rather than replace them—which explains, in part, why there is no local industrial offer in this neglected segment. Although Russia had made significant use of MLRS in the Donbas in 2015, European interest remained limited.

As a result, the French Military Programming Law of 2019–2025 (*Loi de programmation militaire*, LPM) offered no perspective on the future of the French Army's LRUs.[9] Indeed, a capability gap was foreseeable in the short to medium term: French systems had received only limited chassis modernization, whereas other European M270s had been upgraded to greater degrees.

7. S. Ferrard, "De la saturation à la précision dans la profondeur: Le M270 MLRS", *Défense & Sécurité Internationale*, No. 22, January 2007.
8. Interviews conducted with French and foreign military and industrial actors, winter 2025.
9. Rapport annexé à la LPM 2019, available at: www.senat.fr.

Table I-2: European MLRS fleets in 2025

Country	Type	Origin	Number	Gen.
Germany	M270		34	2
	PULS		5 *(ordered)*	3
Bosnia and Herzegovina	APR-40		24	1
Bulgaria	BM-21		24	1
Croatia	BM-21		27	1
	M-92		6	1+
Cyprus	BM-21		4	1
	M-63		18	1
Denmark	PULS		8	3
Estonia	M142		12 *(ordered)*	2+
	K239		6 *(ordered)*	3
Finland	RM-70		34	1+
	M270		41	2
France	M270		9	2
Greece	M270		36	2
	RM-70		115	1+
	PULS		36 *(ordered)*	3
Italy	M270		21	2
	M142		21 (ordered)	2+
Latvia	M142		6 *(ordered)*	2+
Lithuania	M142		8 *(ordered)*	2+
Macedonia	BM-21		6	1
	M-63		11	2
Montenegro	M-63		18	2
Netherlands	PULS		20 *(ordered)*	3
Poland	RM-70		29	1+
	WR-40		75	1+
	BM-21		27	1
	M142		18	2+
	K239		288 *(ordered)*	3
Romania	APR-40		134	1+
	LAROM		36	1+
	M142		54	2+

United Kingdom	M270		26	2
Serbia	M-63/77		78	1+
	M-87		3	2
	PULS		12? *(ordered)*	3
Slovakia	RM-70		28	1+
Turkey	T-122		36	1+
	M270		12	2
	TR-300		50+	2+

Source: Military Balance 2025.

The full-scale invasion of Ukraine that began in February 2022, however, placed MLRS and the need for increased range back at the center of European capability planning. As neither belligerent proved able to secure lasting air superiority, MLRS on both sides—often inherited from the Soviet era—became indispensable tools for delivering both saturation and precision strikes beyond the line of contact. The first post-Soviet systems were transferred in April 2022 at the initiative of Poland and the Czech Republic. These were followed by 20 European M270s, which arrived in Ukraine starting in June, and later 40 US M142s in the fall. Ukrainian forces, which possess limited strike aircraft, quickly appreciated the ability of these systems to strike deep into the enemy's position. By targeting Russian logistics and command structures, in particular, Ukraine was able to force Russia to disperse or pull back from the front line. Ukraine's intensive use of these systems, which was limited only by the small quantity of munitions it received, appears to have greatly facilitated its recapture of the Kharkiv and Kherson regions in the fall of 2022.

The use of MLRS in Ukraine has also revealed the importance of munition stocks and rocket production. (This is equally true for conventional artillery.) A battery of four MLRS with six-rocket launcher pods, firing two salvos per day, would require 1,440 rockets per month. France's stocks are estimated at a few hundred munitions, whereas a regiment equipped with four batteries would require nearly 6,000 rockets per month.[10]

In addition to the M31 rockets initially sent to Ukraine, which have a range of 80 km, older versions of the ATACMS quasi-ballistic missile with a range of 165 km were also sent, starting in October 2023. Although these were delivered in limited quantities and were subject to Washington's restrictions on target selection, they enabled the Ukrainian forces to continue attacking a Russian position that had since reorganized beyond the range of the M31s. In the spring of 2024, more modern ATACMS with a range of 300 km were delivered in unknown quantities. These, too, came with

10. Interviews conducted with French and foreign military and industrial actors, winter 2025.

significant restrictions because of American concerns about the possibility of escalation if Russian territory were to be targeted.

The effectiveness of the MLRS delivered to Ukraine, which combines range, precision, and mobility, triggered a rude awakening in Europe on several levels. The first realization was perhaps the state of decay into which Europe's in-service fleet had fallen, the result not only of insufficient fundamental investment, but also of a lack of concrete prospects for replacement or capability upgrades. The second was the total European dependence, in the absence of a European option, on US platforms and munitions, which would leave Washington free to limit or prevent European strikes in the event of a future conflict with Russia. The third realization, noted particularly by Eastern Flank states, was how effective cluster munition rockets and missiles, such as the early versions of the ATACMS, were against the Russian army. These realizations led to a marked resurgence of interest in these weapons, as well as to Lithuania's withdrawal, in July 2024, from the Oslo Convention. (It was the sole Eastern Flank state to have signed.)

These three realizations, coming as they did in the context of the European rearmament that began in 2022, have prompted a wave of reflection, acquisition, and development among most European states. This movement is aimed at restoring and developing a credible MLRS segment that combines saturation and deep precision strike capabilities and integrating the lessons of the conflict in Ukraine.

Limited options for European rearmament

Given the lack of a local offer in the neglected MLRS segment, European countries have only three options:

- Acquiring an extra-European system off-the-shelf. This is a quick and simple solution, but it only imperfectly resolves the issue of dependence. Poland, the Netherlands, and the Baltic states, among others, have chosen this option.
- Developing a new platform in cooperation with a more advanced partner. This is a slower solution, but it makes it possible to acquire some degree of expertise. Germany and the United States have chosen this option.
- Developing a local solution independently. This resolves the issue of dependence, but it can come with significant lead times and high unit costs if the system is acquired only in small numbers. This is the solution chosen by France, with the Frappe dans la profondeur-Terre ("Deep Strike–Land", FLP-T) program for a 150 km range. This option has been pursued for over a decade by Turkey, and more recently by the United Kingdom, with the NIGHTFALL tender for a surface-to-surface ballistic solution with a range exceeding 800 km.[11]

Limited off-the-shelf solutions

For an off-the-shelf purchase, the choice of system is limited to third-generation platforms with future upgrade potential that can deliver both saturation and precision strikes at longer ranges (150-500 km) to match the tactics observed in Ukraine. This rules out systems derived from Soviet models, which lack the necessary range. Russian, Chinese, and Iranian systems can also be ruled out, for reasons of sovereignty. Currently, three platforms account for the bulk of the European rearmament effort.

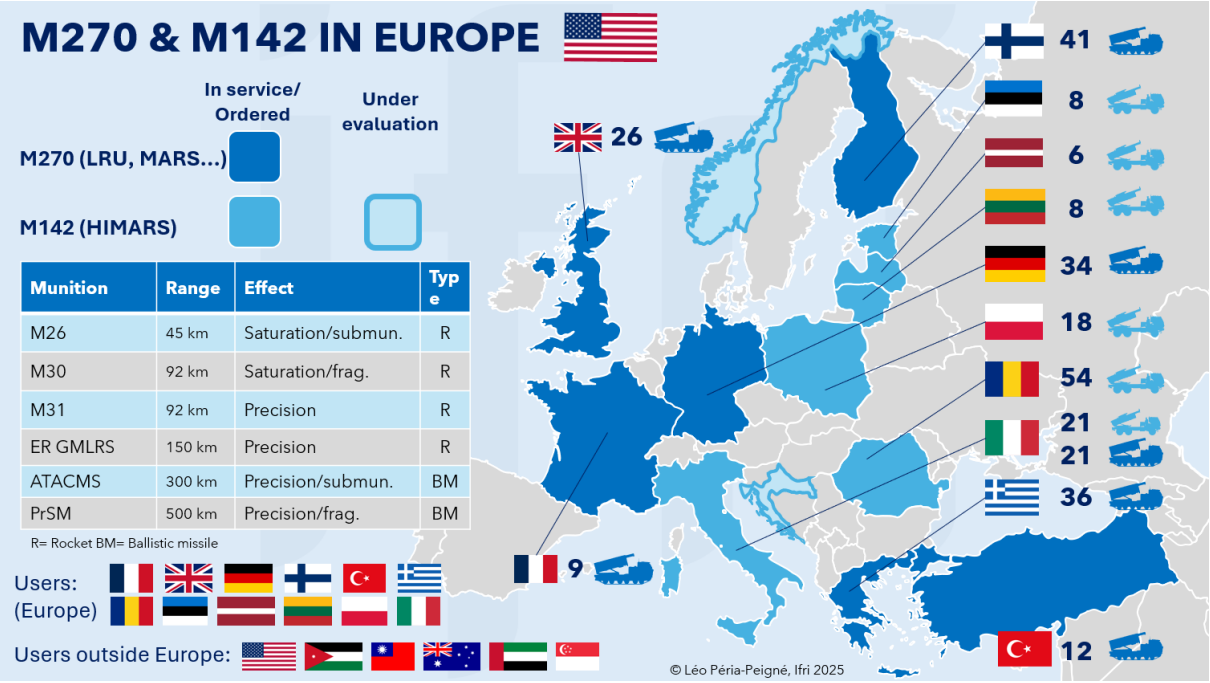
The US M142 HIMARS

The M142 HIMARS, the direct successor to the M270 MLRS, is the preferred choice in 2025 for most armies seeking to reinforce or establish a modern MLRS capability. Italy, Poland, Romania, and the three Baltic states have

11. L. Lagneau, "Le Royaume-Uni va développer le missile tactique balistique Nightfall au profit de l'Ukraine", *Zone militaire*, January 13, 2026, available at: www.opex360.com.

adopted it. Among European countries, then, the HIMARS appears to be the most widespread system, though it is not present in large numbers. (Confirmed orders rarely exceed a dozen systems.) The prospect of a Polish order for 500 launchers, which has been discussed since 2022, has yet to be confirmed.

Map II-1: M270 & M142 in Europe



Source: Military Balance 2025.

The M142 is an air-transportable system. One of its main virtues is its simplicity, which is reflected in a unit cost of €4 million, excluding munitions, maintenance, and training. It also has a large user community and an extensive range of ammunitions. Rockets inherited from the M270 cover a range of 45-80 km, extending up to 300 km in the case of the ATACMS. A new generation of ammunitions is entering service with the Extended Range MLRS, which is intended to reach 150 km. The Precision Strike Missile (PrSM)—a maneuvering quasi-ballistic missile with a range of 500 km—is already in service in the United States and Australia and is set to replace the ATACMS. (Early production was launched in 2023.) In the long term, the PrSM's capabilities are expected to be extended beyond 800 km.

On the other hand, the HIMARS remains a much more American system than its predecessor, the cooperatively developed M270, because the platform and its munitions remain the intellectual property of Lockheed Martin and the US Department of War. This represents a non-negligible risk in terms of autonomy of decision and use. US control can be exercised notably via the fire control system, whose software keys can restrict certain capabilities or coordinates. An MLRS segment based on the M142 and its munitions could thus be subjected to the same constraints Washington

imposed on Ukraine—and this at a time when transatlantic relations have come under considerable strain.

Furthermore, while it is difficult to precisely assess the price of the HIMARS as a system, it remains high, even though it entered service in 2005 and its development costs have already been amortized by US orders. The 54 M142s that Romania ordered in 2018, along with their munitions (including ATACMS), maintenance, and training, cost more than €1.25 billion. That equates to a total unit cost of nearly €23 million—similar to that of a Leopard 2 tank in its most modern version.[12] Its delivery lead times are another frequently noted issue: The six systems Latvia ordered in 2023 are not expected to be available until 2027.[13] Presumably, a new order might not be delivered until after 2030.

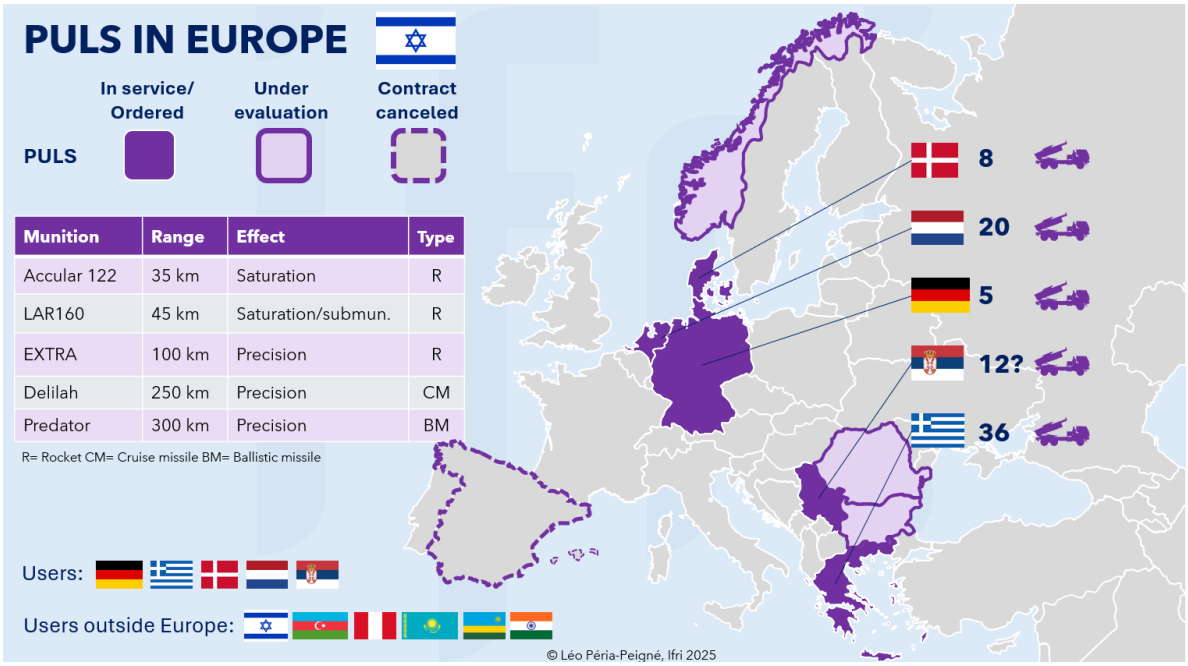
The Israeli PULS

The PULS (Precise & Universal Launching System), which was developed by the Israeli company Elbit Systems and has been acquired in small quantities by five European countries, is an attractive alternative to US systems. The PULS has been in service since 2005 (initially as the Lynx). It is a highly modular MLRS that can field a wide variety of munitions, including older types such as the Soviet 122 mm rocket. In addition to this short-range saturation capability, it also has EXTRA precision rockets with a range of 150 km, the Delilah cruise missile with a range of 250 km, and the Predator Hawk ballistic missile (in service since 2016) with a range of 300 km. The integration of loitering munitions is also in development.[14]

In 2023, Denmark and the Netherlands chose the PULS to re-establish their modern MLRS capability, which they had abandoned at the end of the Cold War. Germany joined this order as a temporary solution to replace the M270s it had transferred to Ukraine. Serbia ordered a number of Israeli MLRS in 2024, and Greece finalized its order for 36 launchers in December 2025 for €650-700 million (representing an all-inclusive unit cost of between €18 and 20 million).[15] Spain's 2023 order for 16 systems, on the other hand, was canceled in September 2025 in protest of Israel's actions in the Gaza Strip.[16]

12. J. Judson, "State Dept. Clears $1.25 Billion HIMARS Sale to Romania", *Defense News*, August 18, 2017, available at: www.defensenews.com.
13. T. Guest, "Europe's Dash to Procure Rocket Artillery", *European Security & Defence*, available at: https://euro-sd.com.
14. Interviews conducted with French and foreign military and industrial actors, winter 2025.
15. L. Lagneau, "La Grèce approuve une commande de 36 lance-roquettes multiples PULS auprès d'Elbit Systems", *Zone militaire*, December 17, 2025, available at: www.opex360.com.
16. T. Martin, "Spain Pulls the Plug on $823 Million Israeli-Backed Rocket Launcher Deal", *Breaking Defense*, September 16, 2025, available at: https://breakingdefense.com.

Map II-2: PULS in Europe



Source: Military Balance.

An agreement signed between KNDS Deutschland (KMW) and Elbit Systems in 2022 was intended to lead to the development of a European version of the PULS, "*EuroPuls*", designed to integrate M270 MLRS precision munitions such as the M31 rocket. Lockheed Martin, however, which owns the M31, refused the consortium, having already partnered with Germany's Rheinmetall since 2023 on a competing transatlantic MLRS project called GMARS (Global Mobile Artillery Rocket System) that would be authorized to use the M31. Beyond the classic issue of comparative advantage, Lockheed Martin's refusal also highlights the considerable leverage that controlling this type of munition can offer.[17] The system was subsequently renamed MARS 3 by KNDS Deutschland.

Although the PULS is cheaper than the M142, it remains uncommon in Europe: Both US competition and the tensions between European states and Israel have dampened its prospects.

The South Korean K239 Chunmoo

The K239 *Chunmoo*, which is produced by the South Korean manufacturer Hanwha (makers of the K9 *Thunder* howitzer), is the third option for off-the-shelf acquisition. Unknown in Europe before the war in Ukraine, it made a dramatic entry into the continental market with Poland's order of 288 systems in October 2022. (This order was among the mega-contracts

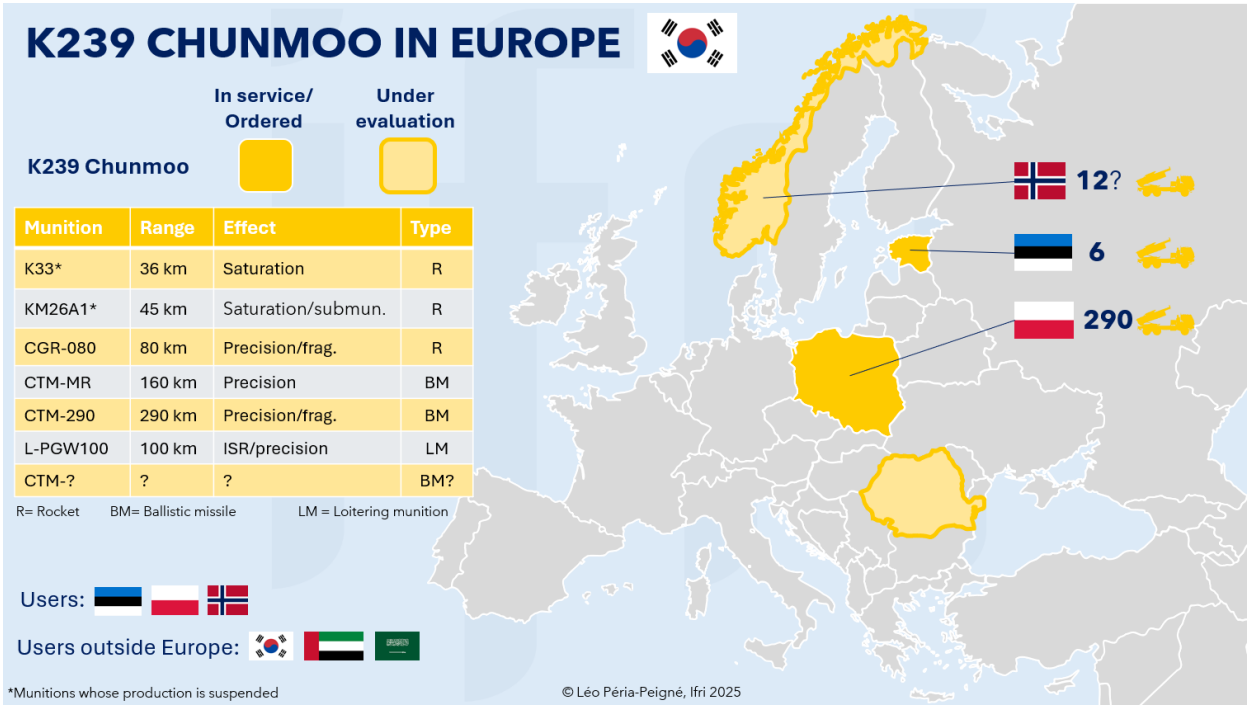
17. E. Gosselin-Malo, "Citing Missile Mismatch, Lockheed Snarls at HIMARS Challenge in Europe", *Defense News*, June 18, 2024, available at: www.defensenews.com.

signed between Seoul and Warsaw following Russia's invasion of Ukraine.) With it, Poland acquired tens of thousands of medium- and long-range munitions, as well as the integration of a Polish chassis and significant technology transfers needed for local munition production.[18] The *Chunmoo* had entered service with the South Korean army in 2015, with over 200 units, and secured its first export order in 2017, to the United Arab Emirates for 12 systems. This was followed by an order from neighboring Saudi Arabia in March 2022.[19] In Europe, Poland's order was followed by one from Estonia, for 6 to 12 launchers, in December 2025, making the Chunmoo the most common modern MLRS in Europe. Over 150 systems were delivered to Poland by the end of 2025. Reportedly, Romania is also evaluating the system, and in late January 2026, the Norwegian parliament announced the approval of a $2 billion budget to acquire 16 launchers and a significant quantity of munitions.[20]

The K239 fields a proprietary 131 mm short-range saturation rocket, designated the K33. For the Polish fleet, integration of the Soviet-standard 122 mm rocket is also underway, at Poland's request. The *Chunmoo* can also fire a cluster munition rocket inspired by the European M270 MLRS's M26, as well as an extended-range precision rocket similar to the M31, with ranges of 45 and 80 km, respectively. Production of these two rockets, however, appears to be suspended for want of demand. Beyond this core capability, similar to standard European MLRS, a surface-to-surface missile and an anti-ship missile with a range of 160 km are available, as well as a tactical missile with a range of 290 km, which Poland has already acquired.[21] A loitering munition, the L-PGW100, with a range of 100 km, is also under development and is expected to be available by 2029.[22] Finally, the Ground-Launched Small Diameter Bomb (GLSDB), developed by Saab and Boeing, which converts aerial bombs into surface-to-surface rockets with a range of 150 km, is also being integrated onto the K239, underscoring Hanwha's openness to foreign munitions. Longer-range munitions are rapidly being developed and should be available by 2035.[23]

18. L. Péria-Peigné and A. Zima, "Pologne, première armée d'Europe en 2035?", *Focus stratégique*, No. 123, Ifri, February 2025, available at: www.ifri.org.
19. K. Dong-Hyun, "South Korea to Extend Export Missile Range from 300 km to 500 km", *The Korea Economic Daily*, August 21, 2024, available at: www.kedglobal.com.
20. "Norway Parliament Approves $2 Billion Artillery Plan", *Reuters*, January 27, 2026, available at: www.reuters.com.
21. P. Langloit, "K239 Chunmoo: Séoul revisite le MLRS", *Défense & Sécurité Internationale*, Special Issue, No. 87, December 2022.
22. A. Kadidal, "ADEX 2025: Hanwha Unveils New Loitering Munition Missile for Chunmoo", *Janes*, October 20, 2025, available at: www.janes.com.
23. Interviews conducted with French and foreign military and industrial actors, winter 2025.

Map II-3: K239 Chunmoo in Europe



Source: Military Balance 2025, interviews.

Not enough comprehensive information is available to precisely estimate the price of a Chunmoo excluding munitions, training, and maintenance. The launcher itself is estimated to cost between €5 and €6 million, with delivery lead times of less than two years depending on the model. Poland signed its contract in late 2022 and received its first MLRS by the end of 2023. Its order for 288 systems is expected to be completed by the end of 2027. These short lead times have been achieved in part by sending systems that had been ordered for the South Korean army's own stocks. The K239 also benefits from the South Korean industry's historical foothold in the European artillery sector. The K9 *Thunder* tracked howitzer and its local derivatives, which are also produced by Hanwha, already equip Norway, Finland, Poland, Estonia, and Turkey. Romania also placed a new order in 2024, including the opening of a production plant and maintenance center.[24]

The HIMARS, the PULS, and the *Chunmoo*, then, are the three major off-the-shelf options for European armies. Other systems are available but have not attracted the attention of European states.

Other systems

The Brazilian *Astros* II offers a wide variety of munitions, ranging from 30 to 300 km, and its user group includes seven nations in Southeast Asia and the Middle East. Spain reportedly evaluated it before opting for the Israeli PULS

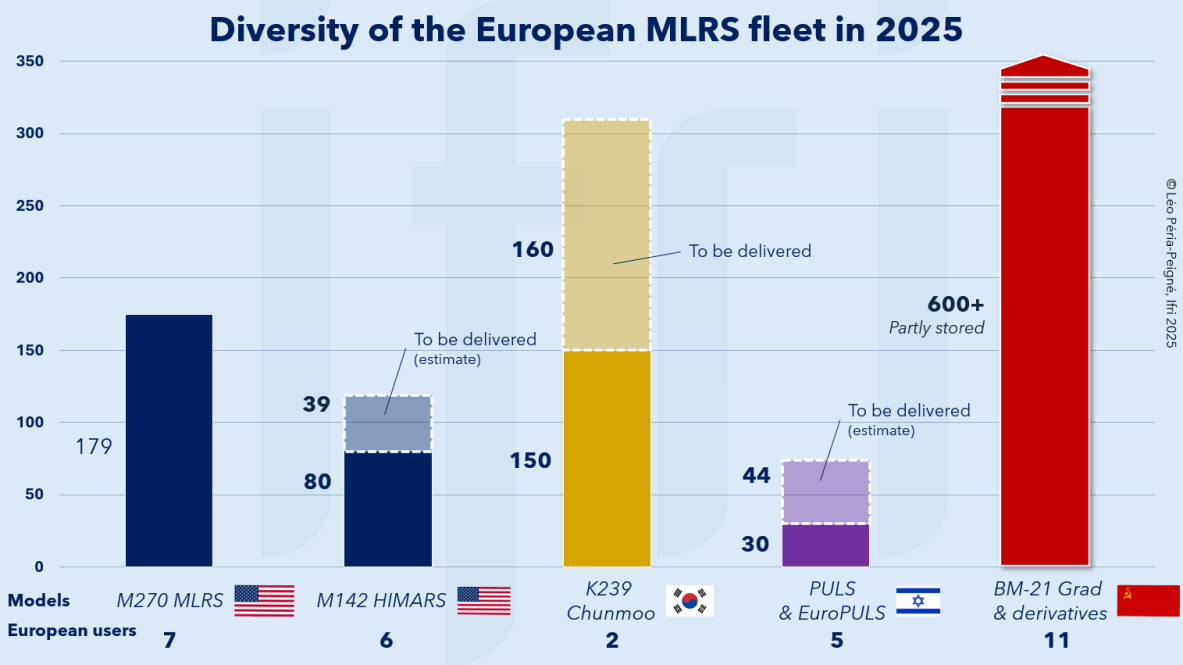
24. J. Adamowski, "Romania to Buy 54 Howitzers from South Korea's Hanwha Aerospace", *Defense News*, June 20, 2024, available at: www.defensenews.com.

(although the PULS contract was ultimately canceled).[25] Avibras, which makes the *Astros* II, is in serious financial trouble.[26]

Turkey, for its part, has developed solid expertise and numerous systems in the field of rocket artillery, including a domestic short-range MLRS, the T-122 *Sakarya*, and the TOROS (similar to the M270), which is derived from the Yugoslav M-87. Turkey's TRG-300 *Kasırga*, meanwhile, which entered service in 2000, enables rocket strikes at a range of 120 km. Turkish MLRS have not been exported in significant numbers; they mainly equip Ankara's forces and those of its allies, such as Azerbaijan.

India has also developed a national MLRS, the Pinaka, which entered service in 2008 after more than two decades of development. In 2025, however, it possesses only limited short- and medium-range capabilities, with a 120 km rocket under development. Only Armenia has purchased this system as of 2025.

Figure II-4: Diversity of the European MLRS fleet in 2025



Source: Military Balance 2025.

25. L. Lagneau, "L'Espagne va investir 580 millions d'euros pour un système d'artillerie ayant une portée d'au moins 300 km", *Zone militaire*, October 14, 2023, available at: www.opex360.com.
26. V. Barreira, "Avibras Gets New Majority Shareholder As It Seeks Financial Recovery", *Janes*, August 12, 2025, available at: www.janes.com.

The case of France: Avoiding a lasting capability gap

France in a tight corner

Of the 57 M270s acquired under the MLRS program in the 1980s, only 13 systems were upgraded to the LRU standard out of the 26 that had been planned in 2011. This modernization effort was focused on the transition from saturation munitions to precision munitions. No effort was made to renovate the chassis itself, which had been developed in the 1970s. The growing obsolescence of the chassis has further reduced the availability of the LRUs: Reportedly, only four units were operational in 2026. As the supply of spare parts comes under growing strain, support for the LRUs is anything but certain beyond 2027, and replacing the platforms is becoming increasingly critical, since they were not included in the 2019-2025 LPM.[27] In light of the lessons learned from Ukraine and the need for credible corps-level organic elements,[28] France launched a program under the 2024-2030 LPM with two goals:

- to develop a national MLRS program to provide the armed forces with a sovereign medium-term deep-strike capability under the Frappe dans la Profondeur-Terre (FLP-T) program, paving the way for deep-strike capabilities exceeding 800 km;
- to acquire an interim capability to bridge the gap left by the announced withdrawal of the LRUs until a sovereign capability enters service.

The 2024–2030 LPM provided for the acquisition of 13 systems by 2030, followed by another 13 by 2035, theoretically doubling the fleet of French launchers. Initially, this new capability is intended to enable the French Army to strike at a range of 150 km, and developing a capability between 300 and 500 km is envisaged in the longer term.[29] The objective is to enable land forces to engage targets at the corps or division level and to take over from the CAESAR self-propelled howitzer, which has a maximum range of 40 km. To this end, the optimal fleet is estimated at 70 MLRS to equip two regiments (one per division), corps-level organic elements, and training units.

27. Interviews conducted with French and foreign military and industrial actors, winter 2025.
28. G. Garnier, “Le corps d’armée, nouvel étalon de puissance pour les forces terrestres”, *Briefings de l’Ifri*, Ifri, April 29, 2025, available at: www.ifri.org.
29. Rapport annexé à la LPM 2023, available at: www.senat.fr.

The French Army will also be able to contribute to suppression of enemy air defenses (SEAD) missions to support the Air and Space Force in gaining air superiority. Counter-battery missions targeting enemy artillery and deep-strike assets are also considered essential to allow French units to reach the front without suffering considerable losses before even making contact. Finally, regaining a short- or medium-range saturation capability could prove indispensable against a less mechanized Russian army that relies more on a large proportion of lightly protected infantry. From a technical standpoint, experts have pointed out the importance of possessing munitions common to NATO allies and, to a lesser extent, the ability to use the remainder of the rockets inherited from the LRU.[30]

The sovereign solution is being pursued through a competition between two consortia: Safran/MBDA versus Thales/ArianeGroup. The first test firings are expected in the first half of 2026, and a system could enter service by 2030. Launching a national program is justifiable for sovereignty reasons, but the European market is saturated by the three systems mentioned above, which have already been ordered by the continent's major armies.[31] This sovereign initiative, then, should be understood as part of a broader deep-strike strategy, not simply as a replacement for the LRU. Without solid export prospects in Europe, we cannot rule out a surge in unit costs that would reduce France's ability to acquire a sustainable quantity. Decoupling the development of the launcher from that of the munition, however, in order to develop a national rocket that would remain compatible with France's allies could offer lucrative opportunities for French industry, particularly if tensions with the United States were to rise.

In addition to these solutions from traditional actors in the French defense industrial and technological base (DITB), another option was revealed in the spring of 2025, when the SME Turgis Gaillard unveiled an MLRS called the *Foudre*. It is intended to integrate the fire control system from Airbus Defence and Space but does not yet officially have dedicated munitions.[32] Furthermore, competitors in the FLP-T program will likely attempt to favor their own launchers and fire control systems by developing them as an integrated package with their munitions.

Limited and unequal options

HIMARS, PULS, or Chunmoo?

The upshot of all of this is that the acquisition of an off-the-shelf MLRS will be required to bridge the gap between the LRUs and the FLP-T program.

30. Interviews conducted with French and foreign military and industrial actors, winter 2025.
31. Interviews conducted with French and foreign military and industrial actors, winter 2025.
32. L. Lagneau, "Le lance-roquettes multiple Foudre de Turgis & Gaillard sera doté de la conduite de tir EFCS d'Airbus DS", *Zone militaire*, October 8, 2025, available at: www.opex360.com.

The **M142 HIMARS** has the advantage of being the direct successor to the M270 MLRS. It reuses its munitions and a significant part of the interface on a lighter chassis. It is a mature system that has been adopted by a number of European partners, and it offers future upgrades. The HIMARS thus meets the needs for platform and munition interoperability and can use the remaining munition stocks. (Neither of the other two systems can.)

However, strained transatlantic relations and Washington's uncompromising stance on Ukraine's use of long-range American munitions are major obstacles. Observers also point to issues related to unit price and uncertain delivery times, since a credible interim capability must be able to take over from the M270s as quickly as possible after 2027. Furthermore, although the HIMARS has been acquired by a number of European partners, the number of platforms in service remains limited to less than a hundred in 2026, and it is uncertain whether the remaining armies that still possess M270s will choose the US solution to replace them.

The **PULS**, meanwhile, is highly adaptable and boasts a wide range of ammunitions. While not as well-known as the HIMARS, it is a mature option. Delivery lead times are difficult to estimate but should be considered relatively short given the small number of orders currently backlogged.

However, relations between Israel and France have come under strain as a result of the situation in Gaza, which limits the credibility of an Israeli solution for France's interim capability. Israeli defense companies were excluded from Eurosatory 2024 at France's request, which implies that a purchase of the PULS is highly unlikely.[33] Moreover, Lockheed Martin's refusal to authorize the use of M31 rockets on the *EuroPuls* further reduces this system's relevance. There are also concerns about the platform's "digital integrity" against Israeli or even US interventions. Finally, fewer than 80 of these systems are in service or on order in Europe, making the PULS the least common modern MLRS on the continent.

Finally, the ***Chunmoo*** also features a wide range of munitions and a long-term development roadmap. It can also integrate local munitions, control of which is ultimately the only truly strategic issue. Among modern MLRS in Europe, the Chunmoo has been acquired in the greatest numbers, and munition production is set to begin in Poland by 2030. Delivery lead times should be short, especially for an order in limited quantities. Options are still available to draw from South Korean army stocks or to join the Polish order. Furthermore, the K239's interface is very similar to the M270's, so the transition would be all the easier.

Like the PULS, Lockheed Martin has not authorized the *Chunmoo* to use the M270's M31 rockets, a privilege that remains the exclusive preserve of the M142 and the future GMARS. Another issue, discussed in our interviews,

33. "Armement: les industriels israéliens indésirables au salon de défense Eurosatory en France", *Le Monde*, May 31, 2024, available at: www.lemonde.fr.

concerns the Chunmoo's gross vehicle weight rating (GVWR) relative to French standards. That said, this problem could be resolved by mounting the launcher pod on a lighter domestic chassis, as Poland has done.[34] Furthermore, an air-transportable version is under development that features a single munition pod instead of two.

Ultimately, acquiring the *Chunmoo* could be a credible interim solution that would also lay a solid foundation for a future French capability, which would reuse the *Chunmoo*'s launchers to fire munitions currently being developed by the French DITB alongside those developed by Sweden (GLSDB) or Poland. In the longer term, these French munitions could be offered natively to other K239 users, which would open up a significant export market in Europe and the Middle East. With the signing of the Treaty of Nancy in May 2025 having bolstered relations between Paris and Warsaw, adopting a common MLRS could open up new opportunities for cooperation based on the binational unit model. This could include a temporary lease of 13 units from the Polish army, which has already received over 150. To reinforce French strategy on the Eastern Flank, this cooperation could also be implemented on a trinational basis with Estonia, where France maintains a forward presence. Furthermore, with the United Arab Emirates and Saudi Arabia already fielding their own K239 fleets, an acquisition by France would help strengthen French strategic partnerships in the Gulf.

The Pinaka, a double-edged opportunity

Besides the three MLRS presented here, the Indian *Pinaka* has also been mentioned occasionally, though recurrently, in the French press. Starting in November 2024,[35] rumors emerged that France was testing this system, and India's prime minister, Narendra Modi, also raised the topic during his visit to Paris in 2025.[36] With India seeking to increase its strategic autonomy in the armaments sector and establish itself as a credible global supplier, a French acquisition of the Pinaka would be interpreted as a strong sign of support for the *Atmanirbhar Bharat* (Self-Reliant India) initiative Modi has championed. More pragmatically, such an acquisition could serve as a symbolic offset for India's procurement of French fighter jets and submarines. (India is reportedly set to purchase 114 additional *Rafales*.)[37] This option must therefore be evaluated not only from a capability standpoint, but also strategically.

34. Interviews conducted with French and foreign military and industrial actors, winter 2025.
35. I. Singh Bisht, "France Assessing Indian Pinaka Multi-Barrel Rocket Launcher", *The Defense Post*, November 13, 2024, available at: https://thedefensepost.com.
36. K. Padmanabhan, "Modi Pitches Pinaka Rockets to Macron as They Discuss Defence, Civil Nuclear Ties, IMEC in Marseille", *The Print*, February 12, 2025, available at: https://theprint.in.
37. L. Lagneau, "Le ministère des Armées confirme l'intérêt de l'Inde pour le Rafale F5", *Zone militaire*, December 1, 2025, available at: www.opex360.com.

The Pinaka is considered a low-cost system. According to our interviews, the unit cost is estimated to be between €500,000 and 1 million—significantly cheaper than the modern platforms currently available in Europe. Delivery lead times could also be very short—potentially under a year—notably by drawing from Indian Army stocks. Finally, acquiring the Pinaka would give substance to the partnership between France and India.

However, these advantages are counterbalanced by a number of structurally unfavorable factors. First, the Pinaka remains a second-generation system based on the Soviet concept of saturation MLRS. It is designed to fire 122 mm rockets and their equivalents. Its development, which dates back to 1986, was particularly protracted and complex. Since entering service, the system's performance has proved significantly inferior to third-generation MLRS, and the quality of its munitions remains questionable following a number of accidents.[38]

The issue of performance should also be addressed. A Mark 2 rocket with a range of 75 km—equivalent to the current French LRUs—has been certified but has not yet been ordered or delivered. A Mark 3 munition with a range of 120 km is in development; it is not expected to be available before 2030, whereas this capability is already mastered and surpassed on the M142, the PULS, and the Chunmoo. A project for a munition with a range of 300 km has also been mentioned, but without specific timelines. To offset these weaknesses, the Indian Army itself ordered a number of Israeli PULS MLRS in 2026.[39] Given that the French Army has expressed a need for a munition with a range of 150 km, the Pinaka does not meet French capability requirements.

Examining the Pinaka option also raises serious questions about the precision of existing rockets and their susceptibility to electromagnetic jamming, particularly because of the use of commercial off-the-shelf components. Above all, these munitions were not developed within a "NATO-compatible" framework and do not correspond to Alliance standards in terms of calibers, safety, and pyrotechnic norms. Furthermore, the Pinaka does not solve the issue of sovereignty over munitions: It is unlikely that India would transfer production capacity for Pinaka rockets to France given the small number of systems envisioned in the 2023 LPM.[40]

From a strategic perspective, acquiring the Pinaka could damage the credibility of the position France has publicly held since 2022 on European preference in armaments—a stance that led Paris to repeatedly block urgent arms acquisitions for Ukraine from non-European suppliers.[41] Although

38. V. Raghuvanshi, "India Orders Homemade Rocket Launchers Despite Its Faulty Ammo", *Defense News*, December 7, 2016, available at: www.defensenews.com.
39. S. W. Miller, "India Procures Israeli PULS Multiple Rocket Systems", *Asian Military Review*, January 26, 2026, available at: www.asianmilitaryreview.com.
40. Interviews conducted with French and foreign military and industrial actors, winter 2025.
41. G. Sorgi and B. Smith-Meyer, "Germany and France Clash over Buying US Arms with €90B Loan to Ukraine", *Politico*, January 12, 2026, available at: www.politico.eu.

there is no fully European modern MLRS, introducing a fourth system (and a far less capable one at that) to the continental market would make France look inconsistent—all the more so given that the ties between India and Russia are far from weak, particularly in the armaments sector. Russo-Indian cooperation can take surprising forms, including in Europe within the framework of hybrid actions. In the opinion of Helsinki's intelligence services, the intrusion of a Russian-made Indian frigate into Finnish and Swedish territorial waters in July 2025 served Russian interests, in this case to test the responsiveness of its neighbors.[42] India has sought to maintain a formal balance in its diplomatic relations, which means that both Moscow and Paris are partners of New Delhi, not allies.

At the national level, and given France's budgetary problems, the possibility that the interim solution will become a permanent one cannot be ruled out. (This prospect was raised frequently in our interviews.)[43] In that case, the French Army would find itself isolated in Europe with a mediocre capability unique on the continent and dependent for its munitions on a partner closely tied to Russia. This would represent not only a major disavowal of France's avowed positions, but also a potentially lasting downgrade for the French Army: It would have acquired a system that lags significantly behind its equivalents in service in Europe and is not interoperable with any of them.

Table III-1: Summary of available options for an interim solution to replace French LRUs

Platform/origin	Estimated price	Max. range	Delivery lead time	European fleet
M142 HIMARS	€5–7 million	500 km	+3 years	80–100
PULS/MARS 3	€5–6 million	300 km	+2 years?	70–80
K239 Chunmoo	€5–6 million	290 km	1–2 years	300–320
Pinaka	€0.5–1 million	120 km *(tests)*	1–2 years	0

42. "Finnish Military Intelligence Review 2026", January 2026, available at: https://puolustusvoimat.fi.
43. Interviews conducted with French and foreign military and industrial actors, winter 2025.

Conclusion

In response to the lessons of the conflict in Ukraine and the likelihood of a conflict in Europe with Russia, as highlighted by the French *National Strategic Review 2025*, Europe has executed an abrupt about-face in the domain of MLRS. Its relative apathy has given way to a rapid and ambitious rearmament effort. Because there is no domestic MLRS offer, this effort currently relies on non-European off-the-shelf solutions with similar capabilities. Local solutions, however, are now being developed, whether in cooperation with firms outside Europe or as fully sovereign systems. The announced withdrawal of American forces from Europe means that European armies' use of multiple different MLRS models makes genuine interoperability between them essential to mitigating the capability costs of such fragmentation. Short of a unified European MLRS fleet, the various models must be able to employ a diverse range of both saturation and precision munitions. Ultimately, the munition remains the only truly strategic element of an MLRS, in terms of its development, its production, and the sovereignty of its use. This is yet another lesson of the conflict in Ukraine.

France has yet to finalize its choice of an interim solution, while sovereign systems mature. Yet the question of sovereignty should not overshadow that of interoperability with European allies already fielding their own MLRS systems. If France were to choose an Indian launcher, both of these strategic aspects would be called into question. In the medium term, France must field a complete system that is as sovereign as possible to guarantee autonomy of employment, while also being capable of integrating into a broader European coalition, both in terms of munitions and command and control (C2).

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