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Defense and Security Issues

Impact of air threats in the Middle East on purchases Air Defense

An electronic magazine specialized in the field of defense and security industries and services

The Middle East and the overlapping markets for fourth-generation fighters

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Table of contents

Defense
and Security Issues

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Defense Products and Operations Theatre Requirements

The theatre of military operations always poses a great challenge to those in charge of the defense and security industries around the world, and the challenges have increased between climatic conditions or geographical composition, or natural obstacles, so these industries witnessed development that began in the aftermath of the First World War and its ferocity increased during the Second World War, and the development continued under fierce competition during the Cold War.

Half a century ago, the two poles of the world in the military industrialization, Russia, which represented the eastern camp, and the United States of America as the commander of the western camp, did everything possible to attract buyers from regions as tense and conflict–ridden such as the Middle East region. Over the years, the western camp has succeeded in attracting countries that were previously consumers of the products of the eastern camp, which has now resulted in great competition between a number of countries that have been able to enter the markets as a strong rising manufacturing power such as China.

The Air Force is the most powerful weapon that can resolve the war at its beginning. We find that pioneers of defense industries around the world and even new producers are racing to keep up with the various challenges and threats by designing fighters capable of achieving control of the air, and thus the pace of development of everything related to fighters has escalated, which has resulted in the need to find a means of protection and deterrence to protect the sky.

As air threats are a fundamental pillar to which armies attach great importance, as they protect the sky, air defense system manufacturers around the world must develop their products to keep pace with the evolution of the arms of air sovereignty, eliminate threats, and secure vital targets or forces in different battlefields.

Land forces, in turn, have been at the heart of development for defense and security services producers around the world. Some products have managed to make a difference by turning the individual fighter into a tank hunter, which gives an advantage on the battlefield, and some of the development has even led to targeting facilities and some aircraft on their runways at airports.

On the sea, we find that the turmoil that struck some areas, securing the economic waters of countries, especially after the discovery of gas wealth, as well as combating piracy operations and illegal migration, were all reasons for the development of various naval units, which, in turn, can carry out their tasks to the fullest.

Various theatres of operation may have been a major reason for testing the efficiency of the weapons that have been developed, whether in Afghanistan, Iraq, Syria, Libya, or Ukraine, and this is what we are following now: the success of some weapons in reaching the level required to operate in different environments and overcome the disparate climatic or terrain conditions.

Editor-in-Chief

We find that the turmoil that struck some areas, securing the economic waters of countries, especially after the discovery of gas wealth, as well as combating piracy operations and illegal migration, were all reasons for the development of various naval units.

Middle East.... and the Fourth-Generation Fighters Overlapping Markets

Since fighter planes are considered one of the most crucial pillars of evaluating the efficiency of any air force in the world, they constitute the main component of its firepower. Therefore, military leaders attach great importance to fighter planes while developing plans for procurement of equipment and armament for their air forces, especially in the Middle East Region, which has been and still is a vital theater for the defense industry community in the world. This is attributed to its large market share in military procurement relative to the rest of the other geographical zones in the world, which is mainly driven by the continuous and revived conflicts therein for decades.

The development of the defense industries in the wake of the end of World War II coincided with the establishment of the global market for defense procurement, which has been closely linked to the global poles of the eastern and western camps represented by the United States and the Soviet Union, which obviously divided the countries of the world in terms of armament, in which the equipment and armament of the state's army is entirely confined with one of the two camps exclusively. Of course, the Air Force, including its fighter aircraft, has been within this framework. Although some air forces began diversifying the sources of their fighters, air force fighters in the world were of almost one style until the fall of the Soviet Union that was witnessed by the twentieth century.

As for the Western Defense Industry Community, the collapse of the Soviet Union for was a new and vital leaping stage, whereby the separation of a large number of countries that were subject to this Union meant their exit from the Soviet Industrial Monopoly, coupled with the desire of some of them to open up links with the Western World, which represented an opportunity for Western defense companies to enter to satisfy this demand. This also has been reinforced by the desire of some of these countries to join NATO and comply with special standards that require the preparation of extensive and different development packages, whether by procurement of the western fighters or making modifications to the old Russian fighters to combine them with NATO's System, whose fighter planes have developed to fourth generation and advanced fourth generation fighters, which currently constitutes the air forces of Eastern European States that have a mixed fleet of fighters combining Russian and Western aircrafts.

As for the Middle East Arena, in which this replacement or overlap is in progress between the sources of fighter models for the single air force that is converted from the eastern and into the western seeking to make up for their delay. This is attribued to the fact that political ties and financial restrictions govern most countries that rely for their fighters on eastern sources, therefore, we find that the air weapons of Iraq, Syria and Algeria until the first decade of the twentieth century, Libya, Yemen, Sudan and Iran relied entirely on eastern (mainly Russian) sources, most of which did not rise to the fourth generation fighters, while we find Kuwait, Saudi Arabia, Qatar, Bahrain, the Emirates, Oman, Jordan, Tunisia, Morocco and Israel have based in their fighter aircrafts upon Western Sources (maily the United States – France – Britain) at levels that rise to the fourth generation and the advanced fourth generation, whereas Egypt is an exception, since since the eighties it has adopted the principle of diversification of armament sources, which made its air force fighters a mixture of eastern and

Euro Fighter

western fighters (Russia – the United States – France).

With the prelude of the second decade of the twenty-first century, some countries in the region began to collapse one after the other, which was contributed to by the great movement in the Middle East region thereafter. Beginning with the collapse of Iraq in 2003, followed by Syria, Libya and Yemen in 2011, including their armies, so the rebuilding four air forces again represents an arena of fierce competition between the global defense manufacturers. Iraq has begun rebuilding and revival of its air forces, heading at this stage towards the West. It began by acquiring American fighters of the advanced fourth generation to rebuild its air force. However, it was crippled with obstacles: logistics have reduced the capabilities of using these fighters, which prompted the Iraqi Air Force to find another alternative.

What are 4 and 4++ Generation Fighters?

It is a term launched by the Global Aviation Manufacturers Community within the classifications of fighters during the past six decades. 4th Generation Fighters were characterized by being multi-tasking, capable of carrying out air-air missions and air-to-ground tasks and equipped with munitions suitable for these tasks at the same time, along with advanced radars that enable the pilot to target hostile planes outside the range of vision, modern flight characteristics, fly by wire, include multiple sensor packages, and high-speed data processing capabilities. All of these capabilities were manifested in numerous fighters that appeared at the end of the seventies and early eighties of the last century, namely, the American F-15 & 16 & 18, the British Tornado, the MIG-29 Russian and French Mirage-2000.

In the wake of the collapse of the Soviet Union and the reduction of Western defense budgets in particular. The transition to the acquisition of fifth-generation fighters became too expensive, therefore, aviation manufacturers resorted to additional updates and integrations for 4th Generation Fighters, some of which are similar to the capabilities of the 5th Generation Fighters, such as high-speed data processing capabilities, and interconnection patterns of information exchanging with other platforms simultaneously, whether land, air or sea platforms, and active electronic scanning radars (AESA). Thereupon, an intermediate classification appeared between the fourth and fifth generations called the 4++ or the fourth generation advanced fighters, which were represented in several models such as F-16V – F-18 Super Hornet – F-15 Stik Eagle, in addition to new models that entered service such as the French Rafale, the Swedish Grepin-39 and the Chinese J-10. In the following table, we will review the most vital elements of the evaluation of the latest fighter models operating in the eastern region middle:

Model / Capabilities	F-16 BLOCK 70	F-15EX	F-18 SUPER HORNET	Mirage2000-9	Rafale	Euro Fighter	SU-30	MIG-29M2
Engine	F110-GE129 / F100- PW229	F110-GE129	F414 – GE – 400	SNECMA M53-P2	M88-4E	EJ200	AL-31	RD-33MK
Engine outlets routing	NA	NA	NA	NA	NA	NA	3 D	NA
Engine thrust	13 tons	13 tons	8.5 tons	9.9 tons	15.5 tons	9.1 tons	NA	9 tons
Maximum speed	2.02 Mach	2.5 Mach	1.6 Mach	2.2 Mach	1.8 Mach	Mach 2	1.75 Mach	1.72 Mach
Maneuverability	9G	9G	9G	9G	+9G/-3.2	9G	unlimited	9G
Ceiling Height	5000 feet	60000 feet	50000 feet	60000 feet	50000 feet	5500 feet	16100 meter	16200 meter
Climb Rate	304 meter/ second	342 meter/ second	NA	285 meter/ second	300 meter/ second	315 mete/ second	230 meter/ second	330 meter/ second
Empty weight	9.7.2 ton	25 ton	14.5 ton	NA	10 ton	NA	24.9 ton	13.3 ton
Full Load Weight	23 ton	40.5 ton	29.9 ton	19.2 ton	24.5 ton	NA	34 ton	26.5 ton
Internal fuel	7000 pound	NA	3600 pound	NA	4.7 ton	NA	4310 كجم	NA
External fuel	2268 pound	NA	NA	NA	6.7 ton	NA	5090 kg	NA
Number of external mount points	9	19	11	9	14	NA	12	9
External payload	12.7 ton	14.7 ton	NA	NA	9.5 ton	NA	8 ton	6.5 ton
radar type	APG-83 AESA	APG-82 AESA	APG-79 AESA	RDY-3	RBE-2 AESA	ECRS MK2 AESA	N 010 ZKUK-27	ZHUK-ME
Dealing with air targets simultaneously	NA	NA	NA	NA	8	NA	4	4
Autonomous electronic warfare systems	NA	NA	NA	NA	SPECTRA		Sorption	NA
number of motors	1	2	2	1	2	2	2	2
combat range	860 kg	1920kg	2	1328 kg	NA	NA	3000	1700 kg
Possibility of aerial refueling from another fighter	NA	NA	available	available	available	NA	available	available
OSF Electro-optical self-detection and tracking system	NA	IRST	IRST	NA	FSO	available	IRST	IRST
Engine life	12000 hour	2000 hour	1000 hour	NA	NA	NA	NA	4000 hour
Flight hour cost	$8000	$27000	$18000	NA	NA	NA	NA	NA
Air-to-air missiles	10	12	10	6	6	6	12	8

Overlapping Markets of the Middle East and North Africa:

The Middle East is an extended theater of conflicts, as the region extends from the eastern Arabian Gulf to the Pacific Ocean and from the northern Mediterranean to the southern Red Sea, encompassing a number of twenty countries. Its fighter planes vary between eastern and western models with more than one model. There are countries that own Western fighters only, such as Morocco – Tunisia – Israel – Saudi Arabia – Oman – UAE – Bahrain – Qatar – Kuwait – Jordan – Turkey, and there are countries that own only eastern fighters such as Algeria – Sudan – Syria, along with a few countries that have a mixture of eastern and western fighters of origin, such as Egypt – Iraq – Iran, and it should be noted that countries such as Libya – Yemen are engaged in internal fighting, as a result of which the entire army collapsed, and it cannot be evaluated in a reliable way so far.

The current form of the fighter market in the Middle East and North Africa has roots and reasons that extend for more than half a century, but it mainly stems from an international political position that is directly driving the procurement outlet for air weapons to a specific source, or at least towards whether it is eastern or western, and the following table shows the sources of procurement Countries in the region according to decimal periods:

F-18 SUPER HORNET

F-15 EX

F-16V

State / Duration	1950s	1960s	1970s	1980s	1990s	2000s	2010s	2020s
Morocco	–	American – Soviet	French	American	–	American	–	American
Algeria	–	Soviet	Soviet	Soviet	Belarus – Ukraine	Russia	Russia	–
Tunisia	–	American	–	American	–	–	–	–
Libya	–	American	French – Soviet	–	–	–	–	–
Egypt	Britain – Soviet	Russia	Soviet – French – American	French – American – Chinese	American	American	Russia– French – American	Russia– French – American
Sudan	–	**Chinese – Soviet**	–	**Chinese – American**	**Chinese**	**Chinese**	**Ukraine**	–
KSA	**American**	**Britain – American**	**American – Britain**	**Britain – American**	**Britain – American**	**Britain**	**American**	–
Yemen	–	–	–	–	–	**Russia**	–	–
Oman	–	–	**Britain**	**Britain**	**Britain**	**American**	**American – Britain**	–
UAE	–	**Britain**	**French**	**French**	**French**	**American**	**American**	**French**
Qatar	–	**Britain**	–	**French**	**French**	–	**French – Britain – American**	**American**
Bahrain	–	–	–	**American**	**American**	–	–	**American**
Kuwait	–	**Britain**	**French – American**	**French – American**	–	–	Italy	–
Iraq	**Soviet – Britain**	**Soviet – Britain**	**Soviet – French**	Chinese – French – Soviet	–	–	**American –** Russia	–
Iran	**American**	**American**	**American**	Chinese –North Korea– Soviet	**Chinese**	–	–	–
Syria	Italy– Soviet – Britain – American – Britain	Russia	Czechoslovakia – Soviet – Poland	Czechoslovakia – Soviet – Libya	Soviet	Belarusian – Soviet	Russia	Russia
Jordan	**Britain**	Pakistan - Britain – American	French Britain – American	**French**	**American**	Dutch– American	American - Dutch	–
Israel	French	French – American	American	American	American	American	American	American
Turkey	American	American	American	American	American	American	American	–

Based upon the foregoing, the political relations between countries are what allow or prevent defense sales, in addition to the economic position of the state that may limit its capabilities of acquisition and modernization, as in the case of the Iranian Air Force, or the internal position of the industrialized countries that may impede the procedures for facilitating sales, such as what happened with the Indian Air Force, or technological developments that may postpone the decision to acquire, such as the case of the Kuwaiti Air Force with the F-18 Super Hornet, and the position of the UAE Air Force on the latest class of Rafale fighters, and F4.

However, the joint factor for the success of procurement lies in ensuring the continuity of the mental image of the producer before the defense institutions in the region, it is a factor that needs a long-term plan in which to invest effectively in line with anticipating the needs and requirements of those markets that are not characterized by uniformity in specifications such as the European Market, for example, which calls for maintaining effective lines of communication for the Middle East and its trends, which have a large market share worldwide.

Interference of future directions:

In spite of the clarity of the overlapping markets in the types of its fighters prevailing in the Middle East, the volume of the markets that may enter into that overlap may increase, thus opening the doors for new manufacturers to expand their market shares to those new markets, including those countries that still have internal conflicts that have destroyed the capabilities of their air power is like Libya, and the current international situation resulting from the Russian-Ukrainian war and the subsequent economic, industrial and commercial measures between Western countries, Japan and Australia against Russia, may herald the destabilization of the well-established Russian fighter market in the region such as Algeria – Iraq – Iran – Libya, due to the possibility of Russian industrial plans are affected by these international countermeasures, and thus the air forces operating the Russian fighters find themselves in a future risk if they continue to rely solely on the Russian aerospace industries.

For these reasons, countries that manufacture advanced fourth-generation fighters, such as France, Italy, Sweden, the United States, China, South Korea and India, may represent promising marketing opportunities during the next ten years, based upon market requirements for fighters that meet their operational needs, which indicators manifest that they will increase during the next decade, which are driven by terrorist vectors. in Eastern, Central and West Africa, the competition on both sides of the Arabian Gulf between the Gulf states and Iran has not been resolved, economic sanctions against Iran will be lifted and that will enable it to rearm its largely decrepit air forces.

MIG-29M2

SU-30

deals: Ugandan Aviation Company Signs for a Bell 412EPi

Kampala, Uganda, (March 23, 2022) - Bell Textron Inc., a Textron Inc. (NYSE: TXT) company, announced a signed purchase agreement with BAR Aviation for a Bell 412EPi to support 247/ medical evacuation missions and the new development of oil and gas projects in Uganda.

BAR Aviation is a leading aviation operator in Uganda known for its high quality and professional air transport service in Uganda and the region. Among its many services, BAR Aviation provides air medical evacuation services to support communities and connect them to life-saving medical support.

Greece acquires six additional new Rafale

(Saint-Cloud, France, March 24, 2022) – Eric Trappier, Chairman and CEO of Dassault Aviation, and Vice-Admiral Aristidis Alexopoulos, Director General of Armaments and Investments of the Greek Ministry of Defence, signed in Athens, in the presence of Mrs. Florence Parly, French Minister of the Armed Forces, and Mr. Nikolaos Panagiotopoulos, Greek Minister of National Defence, a contract for the acquisition of six additional new Rafale aircraft. This new contract, which follows Greece's acquisition of 18 Rafale in January 2021, will increase to 24 the number of Rafale operated by the Hellenic Air Force.

Following the arrival at Tanagra Air Base of the first six Rafale of the Hellenic Air Force on 19 January 2022, the 18 Rafale relating to the first contract will be fully deployed in Greece by the summer 2023.The six additional Rafale will then be delivered to the Hellenic Air Force shortly thereafter, starting from the summer 2024.

This additional order reflects the Greek government's great satisfaction with the Rafale's operational qualities, as well as its determination to strengthen the combat capabilities of the Hellenic Air Force in order to guarantee the country's sovereignty and ensure the security of its population in an increasingly unstable geopolitical context.

Carlo Mancusi appointed CEO of Eurofighter Jagdflugzeug GmbH

The Shareholders of the Eurofighter consortium have appointed Carlo Mancusi as the new Chief Executive Officer (CEO) of Eurofighter Jagdflugzeug GmbH as of 1 January 2022.

Carlo joins Eurofighter from Leonardo, where he has held a series of senior roles, most recently as Head of the Fighter Line of Business. There he was responsible for Eurofighter and Joint Strike Fighter programmes for the Leonardo Aircraft Division

His appointment follows Eurofighter's three-year rotation policy. He succeeds Herman Claesen who was Eurofighter CEO from January 2019. Herman has returned to BAE Systems where he has been appointed Managing Director of the Future Combat Air Systems business.

Carlo started his career at Leonardo in 1981 following a Degree in Engineering from the Politecnico in Turin. He is joined on the Board of Management by Wolfgang Gammel, who is appointed Chief Operating Officer Programmes, and Andy Eddleston, who has been named Chief Operating Officer Capabilities.

كارلو مانكوسي

BAE Systems secures £590m contract to provide long term support for the UK's Hawk fleet

The £590million contract secures hundreds of engineering jobs in North Wales, home to No. 4 Flying Training School, responsible for training the UK's next generation of world-class fighter pilots.

As well as providing availability support to the RAF's Hawk T2 fleet, BAE Systems will provide depth maintenance to the RAF's iconic Red Arrows display team from RAF Valley in Anglesey, ensuring the Hawk fleet continues as a global ambassador for the UK.

The Hawk aircraft is heralded by the RAF as its chosen jet trainer to train its student pilots who will ultimately go on to operate aircraft including the Typhoon, F-35 and next generation combat aircraft.

The Effect of Air Threats in the Middle East on Procurement of Air Defense Systems

Over the past decades, the air threats were one of the main pillars developed by the armies within their future vision for the Defense Procurement in relation to several factors, some of which are still constant, some of which have developed rapidly and the others have radically changed. With regard to the organizational aspect related to the foundations for running the air defense systems of different manufacturers, the foundations and elements of their work are still unchanged, as the elements of early warning transfer the information of discovered air threats to the Command and Control Centers which designate the priorities of engagement, then allocate the targets to the fire units of the air defense elements for tracking and encountering them through their various means of fire, to achieve the main objective representing in securing the vital targets or the forces deployed in different areas of the Operation Theater.

According to the correlation to that, the market for military sales of air defense systems is not far from what has been mentioned above, as we will later focus, in particular, on the medium and long-range air defense systems in the Arab region, which has witnessed multiple changes during the past decades that led to changing the requirements of air defense systems this region. For example, the armies of Iraq, Syria, Saudi Arabia, Egypt, Algeria, Libya and Israel were considered among the main markets for purchasing the air defense systems until the end of the Cold War era. With the regional changes occurring throughout the following two decades, the markets of Iraq, Syria and Libya were excluded from the lists of the air defense systems procurement, while on the other hand, Emirates, Kuwait and Qatar entered this market in a considerable way, despite the different sources of reliance for the Gulf countries Group concerning their air defense systems, but in general they represented a rebalancing of the Arab region's procurement market.

The countries: the markets of air defense systems in the Arab region:

The factors of international political linkage affected specifying the procurement sources for the medium and long-range air defense systems in the Arab region, as we find that Algeria, Sudan and Syria still exclusively depend, for their weaponization resources of air defense systems on the products of Russian companies, while the weaponization resources of Saudi Arabia, the UAE, Qatar, Bahrain, Kuwait, Israel and Jordan depend on the American companies. Regarding Egypt, it is obvious from examining the training activities authorized by the Egyptian army during the previous years that it depends on a diverse combination of weaponization sources, as we find that it possesses Russian and American air defense systems at the same time.

The foreign systems of the region armies:

Country / System	SA-2	Patriot	SA-3	HAWK	SA-6	THAD	BUK-M2	S-300	Sky Guard	Tian-ɔ· -long	s-200
Morocco										*	
Algeria			*		*		*	*			
Tunisia											
Egypt	*		*	*	*		*		*		
Jordan				*							
Israel		*									
Syria	*		*		*		*	*			*
Saudi Arabia		*		*							
Kuwait		*							*		
Bahrain				*							
Qatar		*									
UAE		*		*		*					

S-200

BUK- M2

The previous table shows that there is large percentage of air defense systems need to be substituted, such as the SA-2/3/6/200 – HAWK because they are of technical generations from the past decades, even some of them, which have been modernized, reached the maximum life span. With respect of the above, the Arab region market has great opportunities for the global defense companies, to gain sales shares in a region that is deemed one of the most erupted areas around the world.

We will find that the sales opportunities of Russian products to substitute the medium and long-range air defense systems within the region are greater due to their prior spread in those markets, and this does not explain the inevitability for the Russian companies to get that considerable volume of sales. There are major international changes that have taken place and continue to make way for the markets to be opened to different sources than what they were used to get of their previous procurement, as we will find during the previous years, for example, the success of Chinese companies in entering the Moroccan market as its first emergence there in the region, which increases the competition with other producers, especially the Russian companies in principle, alongside with the efforts exerted by some European producers to seize new market share within the region, let alone the success of some companies of the region in manufacturing the medium and long-range air defense systems that made them achieve a large part of self-sufficiency, such as Israel, and there are countries started similar projects, but have not yet reached the level of competition required to enter the market, such as UAE and Turkey.

S-300

THAD

50 –Tianlong

The characteristics and types of threats within the region:

Ballistic missiles:

The Ballistic missiles have become one of the main deterrent weapons for armies, due to their capabilities to hit the vital targets of the enemy in the depth, with the ability to deliver large and diverse destructive force to those targets. Therefore, we will find that the Arab region has four armies that possess strong arsenal of ballistic missiles, i.e. Iran, Syria, Saudi Arabia and Israel. Although the Iranian nuclear program is the most prominent on the ground, the other three countries have strong and diverse ballistic capabilities, whether they are from foreign sources such as Saudi Arabia and Syria or of homemade such as Israel, so the existence of these missile arsenals that all extend to the entire second range of neighboring countries, which will require adding and enhancing the capabilities of encountering these missiles in terms of range, maneuverability and fire intensity.

Cruise missiles:

Although the concept of Cruise missiles may be explained only on American Tomahawk missiles whose range exceeds 1,000 kilometers, there are other types that are significantly considered less in capabilities in terms of range, but they almost have the same characteristics as Cruise missiles in terms of the ability to fly at low altitudes, hitting targets up to 500 km with technologies of guidance, navigation and target multiple targets beside the ability to operate in an environment obstructing the data provided by satellites during aviation. These types have become available to some armies in the Arab region, so we find that Israel has more than one model of this type of domestic manufacture, and also Iran, which has also started local manufacturing program, which has come to fruition in recent years with the emergence of different models of Cruise missiles, and also some Gulf countries that acquire some European types within their combat arsenals, so with the spread of these types of missiles, the ceiling of regional threats has multiplied to search for ways to confront this type of air munitions.

UAVs:

The unmanned aerial vehicles (UAVs) have become one of the weapons that are under the spotlight, whether from specialists or others, due to their growing use in some military stand-off in the previous years, such as the Libyan and Syrian civil wars, as well as the Azerbaijani-Armenian war and finally the Russian-Ukrainian war. UAVs are distinguished by their three categories (reconnaissance – armed – Suicidal) as having weak radar signature, low financial cost, slow flight speeds, and its loss equals zero of human losses, with its expanding range from time to time, to become the most prominent challenges facing the air defense systems in general.

Fighter jets:

It is the traditional challenge for which the idea of air defense systems was formed, and whose capabilities are developing day by day. Their key merits are no longer speed and great maneuverability, but rather they have contain in some of their modern models, powerful self-electronic warfare capabilities, lower radar signature and long-range munitions that are fired from outside the ranges of most air defense systems. In the past, the fighter jet, when it is invading one of the targets with its conventional munitions, constitutes for the air defense systems in general a "single target". Now, one fighter jet can carry at least 4 guided munitions that are fired from outside the range of the air defense systems to raid one target, which constitutes for air defense systems "four targets" instead of one, and that doubled the number of targets to invaded at the same time, beside the smallness of these targets and their accompanying various electronic obstruction measures, so the threat of fighter jet has not lessened its importance, but it is waiting for a military conflict between two equal forces to show its results.

The modern medium and long-range air defense systems:

The recent years have witnessed the emergence of various medium and long-range air defense systems all over the world, and they were not limited, as previously prevailed, to only the Russian and American companies, but French, German and Chinese manufacturers, as well as South Koreans, Israelis and even Iranians joined the defense industry market, other than some Turkish and Emirati companies that have some systems, but they are still under experimentation.

System	Country of Manufacture	Mobile / fixed	Range	Confront of ballistic missiles	Electro-optical guidance capability
Patriot	USA	fixed	Long-range	Available	Not available
THAAD	USA	Fixed	Long-range	Available	Not available
S-400	RUS	Mobile	Long-range	Available	Not available
S-500	RUS	Mobile	Long-range	Available	Not available
S-550	RUS	Mobile	Long-range	Available	Not available
BUK M2	RUS	Mobile	Medium-range	Not available	Available
SAMP/T	FRANCE – ITALY	Fixed	Medium-range	Not available	Available
IRIST	GERMAN	Fixed	Medium-range	Not available	Not available
KM – SAM	SOUTH KOREA	Fixed	Medium-range	Not available	Not available
BARAK	ISRAEL	Fixed	Medium-range	Not available	Not available
DAVID SLING	ISRAEL	Fixed	Medium-range	Not available	Available

Saudi industry to produce THAAD air defense subsystems

In October 2017, the U.S. State Department approved a foreign military sale to Saudi Arabia for THAAD and related support, equipment and services for an estimated cost of $15 billion. About a year later, in November 2018, the kingdom signed a letter of offer and acceptance with the United States for Lockheed's THAAD.

The projects are part of Saudi Arabia's effort to domestically spend 50% of its money set aside for defense equipment and services by the year 2030, according to a statement by GAMI.

"Along this localization journey, and with the robust relations with our international defense partners, air domain defense readiness is expected to be greatly enhanced," said Gasem Al-Maimani, GAMI's deputy governor, said in a statement.

"Lockheed Martin is engaged with its Saudi partners across several capacity-building programs that are formulated to contribute to the realization of the country's development goals.

Construction of Aegis Ashore in Poland nearing completion

WASHINGTON — The Aegis Ashore system complex in Redzikowo, Poland, from the outside appears complete, Vice Adm. Jon Hill, the U.S. Missile Defense Agency director, said, but there is still working going on to complete the system inside.

Construction problems have caused delays in establishing operational capability of the the Aegis Ashore missile defense site in Poland for roughly four years, and MDA and the Army Corps of Engineers have been working to make up for lost time.

MDA has had one operational Aegis Ashore site in Deveslu, Romania, since 2016 and intended to rapidly follow suit with the second site in Poland in 2018. The agency predicted after reassessing the situation that it would not have the site up and running any earlier than 2022.

"When you go to a country like Poland and you set contracts to do military construction, you don't have total control over that," Hill said March 9 at the McAleese & Associates defense conference in Washington. "It's really an Army Corps thing. We could have done a couple of things here, right? I could have stood up here and thrown the Army Corps under the bus but I'm not going to do that. They are our partners and we're doing a really hard thing out there with Aegis Ashore."

Hill has previously attributed delays to the contractor hired in Poland to do construction.

Anti- tank missiles

multitasking against armor strength

The military operations in the Syrian crisis highlighted the effectiveness of the anti-tank guided missiles (ATGM). Since the very beginning of this war, the armed groups used the missiles against the Syrian army, where the Syrian army's control on the ground receded until it lost vast areas of the Syrian territory.

The ATGMs were used to attack on the bunkers, fortifications and the combat aircrafts in their shelters at the airports, as well as the helicopters. Therefore, it was not strange that the USA armed the armed groups with TOW missiles, which were used efficiently after a short period of training. These multi-task missiles were used not only in attacking on tanks but also on buildings, such as the Syrian army's headquarters. The ATGMs have been widely used in the Middle East in the operations of the war against terrorism since 2011 up to date.

This revealed to the ATGM manufacturers the necessary for developing these missiles to cope with the new threats, as well as the results that these missiles can achieve. Therefore, the warheads have become known for their multi- tasks not only for the purpose of penetrating the armors.

MMP France

In 2010, SAGEM Co. was selected to produce and develop a new generation of multi-task anti-tank infrared-guided weapons. In December 2011, a contract was concluded with MBDA Co. to produce a multi-task missile from the fifth generation to replace the MILAN missile. In 2015, Saab Bofors Dynamics Switzerland was awarded a contract from MBDA Co. to produce the multi-task warheads for the fifth generation of MMP system. In 2016, MBDA conducted several tests on the system to verify its ability penetrate the reactive armors. In 2017, the missile underwent hard operating tests in several cold and hot environments, and it showed efficiency in functioning in all environments. The first batch of this missile that comprised 50 missiles was delivered to the French army in 2017.

Features of MMP system

The 5th generation of MMP system is a multi-task top attack anti-tank missile system. In this system, a focus was made on increasing the flexibility of the missile to engage a broad set of multiple targets, such as the present or future generations of tank, personnel, bunkers and shelters. MBDA Co. emphasizes that the missile is characterized by unparalleled high accuracy even outside the absolute visibility. This feature is of special importance because missiles teams have to engage vehicles with modern, sophisticated targeting and shooting systems.

MMP system has a warhead with double guidance of the infrared and highly accurate day camera with GPS for identification and guidance, advanced laser tracker and totally digital screen. The missile has fiber optic data connection that enables the individual to control the missile to engage invisible targets (man controlling the loop) and connecting it with a drone or helicopter (for example) attacking the target outside the man's sight, where the target appear on the screen in front of the solider and then he can launch the missile.

In January 2021, in experiment was conducted, where a drone identified the location of a tank outside the individual's sight (cannot be seen) and the data were transferred to the fiber optic connection, and then a missile attacked the target and destroyed it. This feature is very effective and it increases the effectiveness of the missile.

MBDA Co. emphasizes that the missile is fitted with advanced, multi-task warhead that can be controlled according to the target. This missile can penetrate 1000mm of highly rigid armor and reactive armor and 2000mm of concrete. The missile uses propulsion system of two stages, and it can be launched from enclosed places.

The system is of 27 kg weight with the range is 4km, and it is currently under development to reach 8 km. In 2020, air to ground system and surface to surface system against the speed boats was developed and intergraded with THeMIS robot.

Javelin USA

In the late of 1980s, the USA decided to develop anti-tank missile to take the place of the missile "Dragon", which is a very good wire-guided missile, but in the light of the development of tanks and their armors; the US army concluded a contract to develop a new missile to replace the missile "Dragon". Javelin was designed in the context of a joint project between Lockheed Martin and Raytheon Missiles & Defense. In 1994, the first practical experiment succeeded with 2 km range. In 1995, mass production of this system was started, and it was exported to 20 countries.

Javelin rose to prominence in Afghanistan and Iraq. In Afghanistan, the situation was complicated, where the mountainous nature was an obstacle to the US army. However, Javelin's success in the mountainous operations against Taliban rendered it a missile of high reliability. In Iraq, Javelin destroyed several tanks, military vehicles and some shelters.

Features of Javelin

Javelin system is one of the most sophisticated and advanced weapon worldwide due to the ongoing development it undergoes in accordance with the developments at the military scene and the threats. This system is of top attack category and it depends on Fire and Forget technology. It uses a thermal system detecting the lowest amount of heat at night time and also uses day camera of high definition.

The system is operated by a two-person crew. The missile is fired by self-guidance (GPS) and it attacks tanks from above where the shielding density is less, while shelters and bunkers are attacked directly by the missile. A warhead is updated to be of multiple tasks under the name of FGM-148F.

The missile is fired from a one-time-use container, and the next missile can be used and activated within 15 second. The missile can be used in all whether conditions. This launching method can be controlled to be ordinary method or Top Attack. The Missile is fitted with a tandem warhead that can destroy any tank of any model even from the generations that are still under development. The missile uses two-stage propulsion system that enables firing inside enclosed places.

This system is of 27 kg weight with the range of 2500m and it underdoes development to reach 5000m. The year 2021 witnessed the launched of the totally new FGM-148G type that will have the same name "Javelin", which will replace the multitasking FGM-148F type.

FGM-148G type is characterized with 30% weight less comparing to the previous mode, the low cost, enhanced opportunity for target hitting and improved guidance system, where is uses uncooled thermal warhead to improve monitoring and identifying the target and enhancing the opportunities for destroying the unarmored targets, such as individuals and walls. It is planned to retain this type in service until the year 2050.

In March 2021, Javelin and Stinger were integrated and loaded on a light vehicle to confront the air and land threats at the same time. This joint system succeeded in attacking a tank and a drone at the same time thanks to the improved monitoring and identification system of Javeline FGM-148G, which increased the visibility two times during the night time and three times during the day in all whether conditions.

Javelin was integrated into Stryker vehicles for converting them into tank killers in 2022 project. After successful experiments, some types were equipped with Javelin system that is operated from inside the vehicle. This vehicle showed great effectiveness in urban warfare. In Mosul liberation battles, Javeline systems with Top Attack feature played a very effective role against the armored car bombs. Moreover, several military sources point to the effectiveness of this missile in such missions.

There is no doubt that the US army' recondition of the importance of robots in the present and future mission was the main reasons for holding the first and largest robot military exercise worldwide. This exercises involved the integration of Javelin into the unmanned QinetiQ Titan vehicle of 1 ton weight, which is remotely controlled and is developed to be self-controlled. This test showed success in the urban warfare and ambushes against tank column in Latvia.

Kornet Russia

Russia has a long experience in the anti-tanks weapons that received a broad recognition outside Russia. This includes Malyutka system that was first used in October 1973 by the Egyptian infantry in high efficiency and caused heavy damages to the Israeli armored vehicles. In 1994, experiments started to adopt the missile " Kornet" with the aim of achieving larger range, stronger penetration and better effectiveness against the reactive armors to keep pace with the threats of

the modern tanks. In 1998, the missile "Kornet" was adopted by the Russian army to replace the missile "Konkurs".

In 2003, the first engagement of Kornet was reported in Iraq, where 2 Abrams M1A1 tanks were destroyed. In 2006, Kornet was widely used in Lebanon war between Hezbollah and Israel, where several Merkava tanks suffered from total or partial damage (at that time, Trophy system was not integrated in this tank year). In 2014 during Gaza war, this missile was used but with less damage due to the adopting of Trophy system in Merkava tanks. During the Syrian Crisis, Kornet was used by Hezbollah and ISIS organization that obtained it from the Syrian army's warehouses it seized. In 2014, this missile was also used in the Crimean War between Russia and Ukraine. The success demonstrated by this missile renders the seizure thereof by terrorist groups a grave threat to the regular armies.

Kornet missile family is one of the most prominent anti-tanks guided missile systems, where it was used on the ground in several battles and wars in difference operation theatres worldwide and it succeeded in destroying the targets. In this family, Kornet-EM missile ranks at the top with a range of 10km and penetration ability into1300mm even in the modern ERA armors, light vehicles, fortifications and fortifications, as well as helicopter at low height, drones and close support aircrafts at low level.

Kornet-EM can attack two different targets at the same time and can attack one target with missiles at the same time for the dangerous and fortified targets. Each container have 4 missiles, and 2 to 4 containers can be incorporated and loaded on Nimr vehicle, in other words 8 to 16 missiles can be carried by one vehicle.

The missile is laser guided over the line of sight (SALCOS) and it is fitted with laser tracker with a range up to 15km, accurate targeting mechanisms according to the direction and height and thermal guidance mechanisms. The system comprises two missiles:

9M113M: the main anti-armor weapon that contains a highly explosive tandem warhead with 8 km range and 31kg weight.

9M113FM-3: a missile with one explosive charge, 10km range and 3 kg weight.

In December 2021, Dimitri Litofkeen, the editor-in-chief of the Independent Military Magazine emphasized that Kornet-Em can overcome Israel's Trophy system and any other reactive armor (ERA), through firing two missiles with one laser beam and at short time interval and this can deceive the Israeli active protection system "Trophy".

As a foresaid, Kornet system can be integrated and loaded on Nimr vehicles with a capacity up to 16 missiles, as well as BMP-3 with the same number of missiles, converting them into a tank-killing vehicle or armored vehicle in battlefields.

NLAW — Sweden

In 2002, SAAB cooperated with Thales and the British Ministry of Defense to develop multitasking anti-tank guided missile of short range for the ordinary infantry personnel, on which they can train quickly, with a weight not more than 15kg, which can be deployed to any solider in any place.

The missile is of 12.5km weight and its range is up to 800m. It can be operated within 5 seconds only. This missile is characterized by easy operation and can be trained on easily within one hour. The missile can penetrate armors up to 600mm. This means that it is like an effective automatic weapon of light weight, which renders each soldier a source of danger to the enemy. The missile is guided by magnetic sensors. There are types of the missile with different launching modes: overfly top attack (OTA) or the direct attack (DA). In either mode, Lock activates the target and then the missile is launched in Fire and Forget guidance method. The missile is fitted with 150mm warhead and it uses one-time-use launcher like all modern western launcher. One of the advantages of this rocket is that it can be launched from 20m range at an angle of 45 degrees. This missile is characterized by high efficiency in urban combat and it undergoes experiments to increase its range to 1200m.

Spike — Israel

The Israeli Spike family is considered one of the most important ATGM missile systems in the world, and it consists of 6 systems with different missions and different ranges, starting from 800 m up to 30 km with different guidance systems.

The Spike ER missile, which entered operation service in 1998, is considered one of the most important systems, as it has a range of up to 8 km and is constantly being developed. It totally weighs 98 kg. It contains a tandem warhead that penetrates up to 1000 mm in modern ERA armors, and another head for bunkers and fortifications. It is highly efficient in urban warfare, and is guided by an uncooled TV thermal system and a millimetric radar IIR system. This expands the field of target acquisition, tracking and targeting by two fields of vision, the first of which is wide to detect the target and the other is narrow to identify and direct the target. The missile has the advantage of (OTA) vertical attack, where it activates the "Lock" on the target and then launches in two modes (Fire and Forget) and (Fire Observe and Update), where the target can be changed until the last moment.

Spike NOLS is the longest-range missile in the Spike family with a range of 25 km, and there is information indicating a development process with a range of 30 km. It was unveiled in 2009 at the Singapore Expo, it has a thermal/TV and inertial guidance system that has the advantage of identifying third-party targets such as drones and C4I systems. The missile weighs 71 kg. It contains a tandem warhead that penetrates up to 1000 mm in modern ERA armors, and another head for bunkers and fortifications. The missile's large range, multiplicity of guidance methods and its development made it a suitable missile for several platforms, so it can be integrated on vehicles, armored vehicles, helicopters and ships.

HJ-12 — China

A Chinese missile the development of which began in 2014, and entered service in 2020. It is considered a copy of the American "Javelin" in terms of range and penetration capabilities. The missile has a range of 2,500 m and the ability to penetrate up to 800 mm, the weight of the missile is 13 kg, and it uses two attack modes (OTA) vertical attack or (DA) direct attack, it has infrared and television examiners, and the missile uses a two-stage propulsion system that it can be launched from inside closed places, and there are several copies of it for export and others for launching from the drone.

HJ-9A/B — China

A Chinese missile that entered service in 2005 and is considered a copy of the Russian Kornet. The missile has a range of 5 km and has a tandem head with a penetration capacity of up to 1200 mm, the weight of the missile is 37 kg, and it uses the DA attack pattern of direct attack. It has radar and laser seekers and can be combined with vehicles and armors.

Corsar — Ukraine

The experimental version of the missile was shown at the Emirates Exhibition in 2005 and underwent tests until 2015 and entered the service in 2017. The missile weighs 15 kg and has a range of 2.5 km. It is guided by a semi-automatic laser that is immune to interference. It has a tandem warhead capable of penetrating 550 mm in modern ERA armor, dams and fortifications. There is a Jordanian version of the missile produced by Jadara Equipment & Defense Systems.

Shershen — Belarus

It is a copy of the Kornet D that entered the service in 2012, and it has a tandem warhead with the ability to penetrate 1100 mm in the modern ERA armor, dams and fortifications, with a range of 7.5 km during the day and 3 km at night. The weight of the entire system is 40 kg. The missile relies on two manual guidance systems and anti-jamming laser-irrigation systems.

MSS1.2 — Brazil

It entered the service in 2009 and is an Italian/Brazilian joint venture since 1985. The last version was developed in 2012 and it is Brazilian completely. It has the ability to penetrate 700 mm into the modern ERA armor, dams and fortifications, with a range of 4 km, and the weight of the entire system is 42 kg. The missile relies on two systems and semi-active laser and manual guidance.

Bulsae - 3 — North Korea

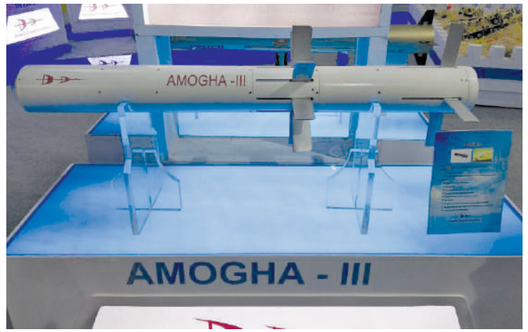
It was unveiled in 2016, and it is a copy of the Russian Fagot missile. It has a tandem warhead with a penetration capacity 500 mm into the modern ERA armor, dams and fortifications with a range of 5.5 km. The entire system weighs 35 kg. The missile relies on a laser-guided anti-jamming system.

OMTAS — Turkey

The contract for the manufacture and development of the missile was signed in 2005. It passed the tests and entered the service in 2015. It is considered the first Turkish medium-range anti-tank guided missile. The missile weighs 25 kg and has a range of 4 km, with the ability to penetrate 1000 mm into the modern ERA armor, dams and fortifications. The guidance of the missile is based on a thermal infrared seeker, an IIR system, millimeter radar system, and an anti-jamming laser guidance system for the UMTAS and OMTAS versions.0

The missile has (OTA) feature vertical attack where the lock is activated on the target and then the missile launches in two modes (fire and forget) and (fire observe and update), where the target can be changed until the last moment, and there is a long-range version of the helicopters and armored vehicles with a range of 8 km under UMTAS name.

Amogaha-III — India



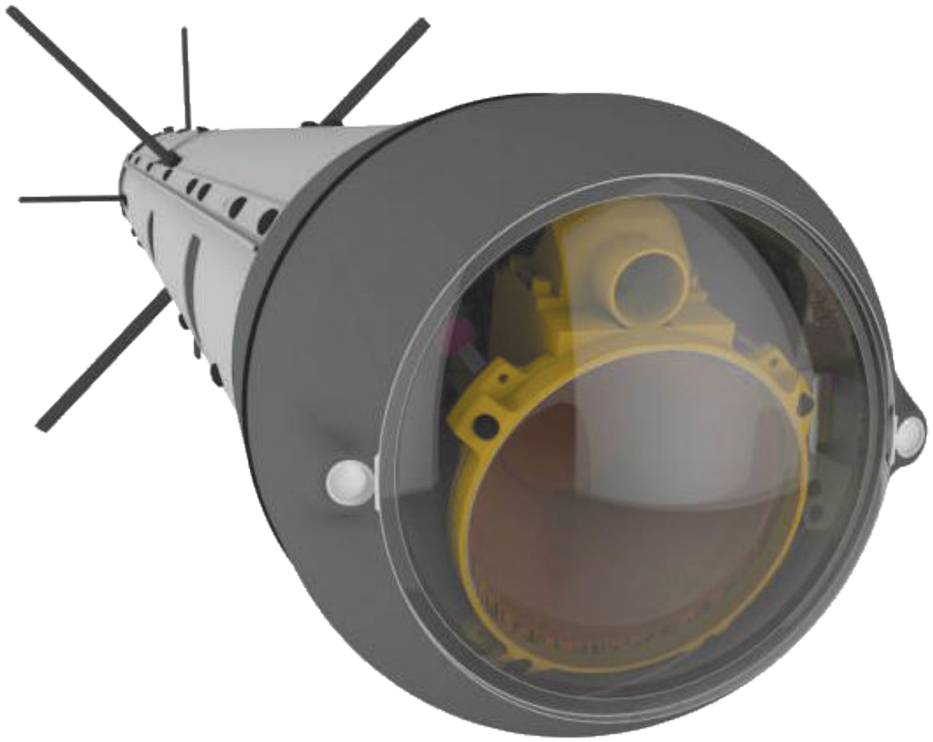
It was unveiled in 2020 at DefExpo, and it has a tandem warhead with a penetration capacity of 650 mm into the modern ERA armor with a range of 2.5 km, the weight of the entire system is 18 kg, the guidance of the missile is based on a thermal infrared seeker and an IIR Radar Millimeter System with the possibility of remote operation (CLU), and the missile has the (OTA) feature vertical attack and (LOBL) feature of locking on the target after the launch.

Jadara Terminator — Jordan

The missile was unveiled in 2018 at the South African exhibition AAD 2018 under the name (AT-Terminator), and it has a tandem warhead with the ability to penetrate 500 mm into the modern ERA armor with a range of 2.5 km, the weight of the entire system is 16 kg, and the guidance of the missile depends on a laser seeker on the sight line, which is semi-automatic, and has an additional fragmentation warhead.

We will outline some general guidance systems for ATGMs, the similarities between many of the eastern and western systems, and the advantages and disadvantages of each system.

Guidance Classification



Since the appearance of the first generation of anti-tank missiles, there has been a difficult equation, which is the range, accuracy of guidance and weight. When the weight is reduced, the range is reduced and the guidance is difficult and requires a highly trained soldier, and when the range is increased, and the accuracy is adjusted, the weight is increased, so the missile manufacturers worked on achieving the difficult equation through the technological development and the experiences of previous wars. Those portable missiles were able to annihilate fully armored brigades, as happened in the October 1973 war, and the Egyptian infantry forces were able to exterminate the Armored Brigade 600 and the Armored Brigade 190 in the Israeli army, and this was the emergence of a telescope and wire-guided Malyutka missile. It is considered one of the first generation.

The market for anti-tank missiles in general has grown due to atypical conflicts and the war on terrorism, which constitutes a new type of war, and despite the fact that terrorist groups possess this effective weapon and give them an advantage, especially in residential places, the possession of the same weapon has been credited In targeting one of their most important weapons, which is car bombs, as happened in Mosul and Raqqa.

Guidance systems are not only one of the most important factors, but they are the most crucial factors in the development of this effective weapon, as they are no longer used only to fight tanks, but also to destroy underground storerooms, fortifications, electricity and communications towers, armored vehicles, logistic support vehicles, aircraft at its airport, and VIP vehicles and others, Here we will highlight the most important features of guidance systems and their role in the efficiency of the missile guidance.

1 Infrared Rays

A passive guidance system that traces the heat emitted from the target to detect and destroy it by means of a thermal sensor in the front of the missile, which is a combination of a set of equipment that captures the infrared radiation emitted by the target, analyzes it and converts it into signals that control and direct the missile towards its goal.

Advantages

- Self-guided, which causes the launcher to leave its place immediately after launch and search for another target.
- Thermal tracing missile is now more accurate and immune to countermeasures as it detects minimal thermal radiation.
- It detects and defines the enemy, especially at night.
- It covers the battlefield as a whole.
- It is difficult to escape.
- Easily trained on and use.

Disadvantages

- Short range, where its range does not exceed 5 km.
- The ability to escape from it by smoke bombs and thermal balls.
- The missile price has risen due to the thermal sensor installed in the missile head

2 Radar Guidance

It is guidance by means of active and inactive radar waves to search for and track the target at close or far distances, and this is done by using the radar sensor at the launch base that tracks the target even while it is in motion.

Advantages

- It detect, track and destroys targets at long distances of up to 10 km or more.
- It tracks the target while in motion.

Absolute protection in terms of detection and launch from long distances.

Working in all weathers.

- It surprises the enemy and does not give him time to respond.
- It can be fired while on the move

Defects

- It is possible to detecting and suppress the work of the radar if the tanks have electronic warfare procedures such as the Merkava.
- It should focus on the target until hitting it.
- It represents a source of danger to the crew at close ranges due to the continued tracing of the target until it is hit.

3 Laser

It means tracking and destroying the target by a laser beam fired from the launch base on the target continuously until hitting it, which is known as semi-active laser guidance, if it is from the missile itself, it is called active laser guidance.

Advantages

- It is able to hit stationary and moving targets at long distances.
- It works in all weathers.
- It can be routed through a third party.
- It is able to hit targets at long distances.

Defects

- Keeping lighting on the target.
- It can be dispersed through smoke or water.
- The operator can be detected when the enemy detects the laser beam.
- It requires long and intensive training.

4 Wire Guidance

Means guiding rockets through wires or more accurately through the signals sent in the wires (fibre optics) as it allows guiding the rocket beyond the visibility range.

Advantages:

Guidance in the middle- distances.

Difficult to be disturbed.

Can be controlled till the last moment.

Disadvantages:

Existence in the same place of launch till the full destruction of the target.

Can be dispersed with smoke or rain and fog.

Good and long training.

5 Inertia Guidance

Means the pre- storage of rocket trajectory without external interference and coordination between the missile path and the flight through computer. Any fault can be automatically corrected till the full strike of the target.

Advantages:

Very suitable in long range distances.

It is difficult to be disturbed.

Can be back- controlled.

Disadvantages:

Coordination must occur during the missile's flight, or the place of the target may change consequently; it may be lost.

The possibility of detecting the missile during its flight and then dealing with.

Hence, it is obvious that the method of missiles guidance results from the war doctrine of each manufacturing state for example; most of heat- seeking (Infrared homing) and laser missiles are from West "Europe and US", while missiles of laser and radar guidance- which have farther range- would be in the East "Russia" and each state has its own customers who have the same war doctrine and the same hostilities.

Hence, it is obvious that the method of missiles guidance results from the war doctrine of each manufacturing state for example; most of heat- seeking (Infrared homing) and laser missiles are from West "Europe and US", while missiles of laser and radar guidance- which have farther range- would be in the East "Russia" and each state has its own customers who have the same war doctrine and the same hostilities. Western weapons have a great capability of penetration, accurate guidance and light weight but they are expensive, have short range, can be easily dealt with and be trained in most classes however very effective such as the American missile "Javelin", the French; "MMP", the Swedish "NLAW" and the Israeli missile "Spike". Most of them depend on logic in attack like NOT CLEAR, and multi guidance missiles, multi- tasks for the one warhead missiles multi-launching platforms. Lethal weapons with heavy weight, long range and radar- laser guidance and very high ability of penetration like Kornet which is popular and racen for tanks, trenches and fortifications.

Rocket Descriptions	Manu-facturing state	Max-imum Range	Shielding Penetra-tion	Fortifica-tion Pene-tration	Homing Pattern	Times of guid-ance after launching	Upper Attack	Use of emitter	Push sys-tem
MMP	France	.Km 4	.ml 100	.ml 200	Infrared Radiation + laser+ televisional + GPS wire	Control till the last moment	Applied	Once	Two stages
Javelin	US	.Km 2.5	.ml 800	.ml 1000	Infrared Radiation + Televisional guidance	Once	Applied	Once	Two stages
Kornet	Russia	.Km 10	.ml 1300	.ml 1300	Laser+ Radar	times 5	Not Applied	Not known	One stage
NLAW	Sweden	.ml 800	.ml 800	.ml 800	Inertia + expected sight	Once	Applied	Once	Two stages
SpikeER	Israel	.8Km	.ml 1000	.ml 1000	Thermal+ Televisional + Radar	Control till the last moment	Applied	Not known	Two stages
Spike NOLS	Israel	.km 25	.ml 1000	.ml 1000	Thermal + Televisional + Inertia + C41	Control till the last moment	Applied	Not known	Two stages
HJ-12	China	.km 2.5	.ml 800	.ml 800	Thermal+ Televisional	Once	Applied	Once	Two stages
HJ-9A/B	China	.km 5	.ml 1200	.ml 1200	Laser+ Radar	Twice	Not applied	Not known	One Stage
Corsar	Ukraine	.km 2.5	.ml 550	.ml 550	Semi- automatic Laser	Once	Not applied	Not known	One stage
MSS1.2	Brazil	.km 4	.ml 700	.ml 500	Manual/ semi active laser	Once	Not known	Not known	One stage
3-Bulsea	North Korean	.km 5.5	.ml 500	.ml 400	Laser	Once	Not known	Not known	One stage
OMTAS	Turkey	.Km 4	.ml 1000	.ml 1000	Infrared Radiation/ laser	Control till the last moment	Applied	Not known	Two stages
UMTAS	Turkey	.km 8	.ml 1000	.ml 1000	Infrared Radiation/ Laser+ Radar	Control till the last moment	Applied	Not known	One stage
Amoga-ha- III	India	.km 2.5	.ml 650	.ml 650	Infrared Radiation/ Radar	Control till the last moment	Applied	Not known	One stage
Termina-tor- AT	Jordan	.km 2.5	.ml 500	.ml 500	Laser+ Simi – automat-ic vision line	Not Known	Not applied	Not known	One stage
Shershen	Belarus	.km 7.5	.ml 1100	.ml 1100	Manual+ laser guid-ance anti disturbance	Once	Not known	Not known	One stage

Systematic and un systematic operations

Anti– tanks missiles are considered very effective weapons in the war. This appeared obviously during the war in Afghanistan, Iraq and Syria but we should say that the first actual appearance for the powers of Anti– tanks missiles was during October war 1973.

After half an hour from the Egyptian forces crossing to Suez Canal, as was scheduled in the Israeli plan of "Burg Al Hamam", the Israeli tanks pushed to their sites on the sand dune however was preceded by sharpshooter troops of the Egyptian Corps Forces and the main weapon for these troops was the rocket Malyutka on which they trained the whole year of 1973. Some sources indicated that one solider in that war was able to shoot more than 25 rockets daily on different targets, which showed the great losses amongst the Israeli armoured vehicles.

During that war the Egyptian fighter was able to defeat all attacks of a whole armoured vehicle, as the daily toll of 7th of October 1973 only was 60 Israeli tanks destroyed by the Malyutka Rocket which has the largest share in the destruction thereof. General Hertzog said that Israel lost in the first three days of 1973 war 400 tanks on both the Egyptian and Syrian fronts. Anti– tanks missiles proved through the Armoured Corps in 1973 war that they are capable of defeating armoured attack and destroy thereof and the way with which they were used by the Egyptian forces changed the concept of using armoured tanks moreover made the sharpshooter troops as an integral part of the armoured crews.

During the Iraqi– Iranian war, both armoured crops of the two fronts used anti– tank missiles on a large scale so, the Iraqi troops incurred a very great losses however after four years, to be more accurate in 1984, the Iraqi troops used anti– tank missiles but this time with high efficiency and were able to give Iran a hell and strike the Iranian forces back which was some sort of repetition to the lessons learned from October War.

Then the new Russian weapon "kornet" appeared and was used during the Iraqi war which has incurred the US forces great losses especially in Abrams Tanks but was not used on a wide scale in the Iraqi war. However, in the Lebanese war in 2006 between Israel and Hezb Allah "Kornet" weapons were used on a large scale and incurred Israel great losses in their tanks "Merkava" as some resources refer that more than 55 tanks from which were 25 fatal injuries due to suing "Kornet" Weapons.

The importance of ATGM weapons appeared again to the military experts despite the development of tanks and ways of shielding but the most vital lessons of the Lebanese war in 2006 the emersion of (APS) Trophy, a system for destroying Anti– Tank Guided Missiles (ATGM) existed on Merkava and proved its efficiency in Gaza war in 2014 as no tanks were destroyed during the operation of the protective Edge "Al Garph Al Samed".

The US armed the Syrian groups with Anti– Tanks Guided Missiles due to their effectiveness as it armed some groups with TOW missiles which they used in destroying tanks and fighters of the Syrian army on their runway. The Syrian war was full of many ATGM weapons many of which were obtained from the Syrian army warehouses and others were provided as a sort of support to the armed groups from US and the western states, these weapons are like; the Russian Kornet, the French MILAN, the Chinese HJ*8, the Russian Fagot and Konkours.

All these weapons were possessed by the different terrorist armed groups from which is ISIS (Daesh) that showed in one of his publications using the Russian missile Fagot opposing air– landing operation with Russian Helicopter MI24– MI–8 in Syria.

ATGM weapons weren't stopped to be used as anti–tanks only but were used on a large scale to target Helicopters, fortifications and even persons so they became multi tasks and without which any state can't enter any war.

The latest operations showed the inability of tanks and armed vehicles even of the new generation to struggle against ATGM weapons as the ability of penetration which exceeded 1.500 ml. in some weapons plus the high accuracy, multi guidance and range which exceeded 10 Km. as well as the vertical attack, light weight and the easiness of training that enable any civilian to destroy any tank within few days, if not, hours and be able to fight in street, laneways, jungles and hunting tanks easily, which interpret the US and NATO refuge to arm Ukraine with Penserjaust, NLAW and Javelin as they are light, can be trained easily and have high accuracy. However, as we mentioned before, the arise of automatic protection for tanks complicated the missions and the eternal struggle between the missile and the tank.

Development and Update of ATGM systems:

The effectiveness of anti– tank guided missiles since the second world war and October war and arise of towns and rebellions fights showed the increased danger from foot infantry personnel on ATGM weapons, and forced tanks manufacturers to increase and develop shieling as well as merging tanks automatic protection systems like Trophy and electronic systems to disturb missiles. Also, this effectiveness encouraged ATGM manufacturers to develop penetration ability, detective heads, guidance systems that now become controlled by C41 and with third end.

In spite of all this development, once again they talked about the weapons of kinetic energy, this was an American project produced by Lockheed Martin that started in 1981 during the Cold War but stopped due to political and economic circumstances.

In 2009, the project of Compact Kinetic Energy Missile (CKEM) was resumed again, anti– tank missile system with a speed exceeding 5 Mach without need to Heat and is guided through view line (LOSAT) and is capable of diverting the automatic protection systems of tanks (APS) which started to develop in a high speed. This system works with dry fuel and can reach to 6 Mach so, anti– tank missiles can exceed automatic protection systems of tanks (APS) in addition to the light weight of the rocket which is less than 50 kg, the percentage of destruction that exceeds 99% and would be effective against the future electronic systems.

That system was constructed to confront the danger of the soviet tanks and was capable of stopping it with the least number plus speedy and effective ammunitions. In 2007, the system was tested on tank T–72 with Energy Reactive Armour (ERA) and the tank was successfully destroyed and then the system was tested on tank M–6 and the same happened.

Surface-to-Surface Missiles:

Vessels Armament and the Requirements of the Middle East

the Requirements of the Middle East

The current Russian–Ukrainian war has once again reiterated the importance and impact of surface–to–surface missiles in the face of large naval vessels, following information circulating about the targeting of the Russian cruiser Moskva with an anti–ship missile and its sinking in the Black Sea near the Ukrainian Coast in front of Odessa City.

Information is not confirmed on whether the missile was Ukrainian–made or part of the British Aid provided by London to Ukraine, despite the absence of any apparent operational role for any of the Ukrainian Fleet in the Black Sea, and the Russian Fleet's complete control over the arena of operations, the sinking of the Russian cruiser revived and highlighted the vital role of this type of missile in modern naval operations theaters.

This strike reminded the military community, whether manufacturer or user, of the need to re–evaluate the impact of surface–to–surface missiles in the theater of operations, of all kinds, whether they were launched from coastal, air, surface or subsurface platforms, especially in cases where the balance of power between the warring parties is unequal in terms of capabilities or numbers. This incident is added to the record of the actions of this type of missile in various conflicts during three successive decades between the sixties, the first was after the Egyptian navy destroyed the Israeli destroyer Eilat with a surface–to–surface missile in 1967, and the second incident was in 1982 when Argentina sank the British destroyer Sheffield during the battles of the Falklands War, the last of which was when the American frigate USS Stark was hit in 1987 by two Iraqi surface–to–surface missiles in the Persian Gulf during the Iran–Iraq war.

Otomat

• What are anti-vessel missiles?

Anti-vessel missiles are currently the principa weapon for any combat naval vessels, regardless of their size or artilleries of large and varied calibers, which were the main armament of combat naval vessels centuries ago, they were replaced by guided missiles that became capable of hitting targets outside the visual range of sight with tens of miles away, with extreme accuracy, through the accumulation of research in modern armament systems in various specializations, both in terms of engine capabilities, the missile propulsion of these missiles, or the development of marine navigation devices that enable them to fly at heights almost touching the surface of the water, which gives them the ability to reach very close distances from the target before they are detected by radar, aided with the development of modern generations that enable the missile to take an indirect path towards a target and enables the missile to avoid or exploit the terrain in the area of operations.

Anti-ship missiles are characterized by their versatile types and categories. There is a category that is launched from land platforms, and others are launched from air pla t forms, in addition to those launched from marine platforms, whether above or under the sea surface, and there are types that are characterized by launching capabilities from al l of these platforms.

Here, we will shed light mainly to the surface-to-surface missiles launched from naval platforms, due to their centrality in all naval military actions, whether defensive or offensive, and the capabilities of this category, according to their manufacturers, to hit sea and land targets in some of their models in terms of working ranges, accuracy of hitting and navigation capabilities.

The capabilities of each component of these missiles have developed magically during the previous decades, driven mainly by their results that were achieved during some previous wars, although they were scarce, they were very influential in the naval theater of operations, reinforced in this by the fact that all successful use records were achieved by the weakest party in the armed conflict, we will find that the Israeli destroyer Eilat was sunk by the Egyptian army, which was defeated in the 1967 war, and also the English destroyer Sheffield was sunk by the Argentine army during the Falklands War, in addition to the injury of the American destroyer Stark from Iraq during the First Gulf War, the last of which reported is that the reason for the sinking of the Russian cruiser Moskva in the current war in Ukraine was a Ukrainian missile.

Here, the effect of this type of naval armament in the theaters of operations is manifested at different time intervals, and if all the previously achieved successes come from the weaker party, what is the effect when it is used by the more powerful party, or at least by an equal party with the other, it is evaluated according to the size of the technical development resulting from the employment of these expertise on the one hand, and on the other hand the investments that are injected by manufacturers to develop their own models to be advanced in the international competition market among manufacturers, taking into consideration the type of tasks that have begun to enter into the destruction capabilities of surface-to-surface missiles.

Manufacturers Market:

The segment of countries that manufacture surface-to-surface missiles in the world is considered large, as it currently combines 17 countries whose companies produce their models almost independently, and a few of their countries work on joint programs, such as France, Italy or India and Russia. It is re-iterated that the defense industries spans for decades, this accumulation and competitive momentum has led to the existence of a wide range of missiles equipped with diverse capabilities that allow for multiple operating options for users in the countries of the Middle East, and also sheds light to the direct relationship between the source of purchases of combat naval units and surface-to-surface missiles that they are armed with. The following table illustrates the countries that manufacture and the types of missiles produced by their companies:

Rocket	Manufacturing country	Year manufacture	Condition
3M -54	Russia	2006	220Km
P-700 granite	Russia	1983	600Km
Mosquito	Russia	1980	250Km
Harpoon	USA	1977	280Km
Otomat	France - Italy	1977	210Km
Exocet	France - Italy	1975	180Km
Sea eagle	بريطانيا	1985	110Km
Rbs - 15	Sweden	1998	200Km
Naval strike	النرويج	2009	185Km
Nsm	Norway	2007	185Km
Nepton	Ukraine	2021	300Km
Brahmos	Russian - Indian	2006	3600Km
Atmaca	Turkey	2017	220Km
Som	Turkey	2006	250Km
Xasm-3	Japan	2016	150Km
Hsiung feng iii	Taiwan	2007	400Km
Gabriel	Israel	1985	80Km
Hae sung - i	North Korea	2005	150Km
Mansup	Brazil	2009	100Km
Nor	Iran	2004	180Km
Yj-62	China	2004	400Km

It is noted from the above table that there are some missiles dating back four decades, but they are still found in the navies of many countries as a result of the continuous updates that are made to the same missile model, which is popular in its sales internationally. It is also noted that the nineties did not witnesses almost any emergence of new missiles, and this is due to the Post-Soviet Era and the decline in the budgets of countries in general, which directly affected the sales of companies and consequently the volume of expenditure on research projects related to new missiles.

Map of Users in the Arab region:

A brief overview of the region exporters + Table

The large size of the global surface-to-surface missile manufacturers contributes to filling the different requirements of the different navies, whether in terms of specifications, cost or political reasons, which is evident in the trends of the sources of purchases for the Middle East countries. The following table shows these trends:

• The future of the market in the region:

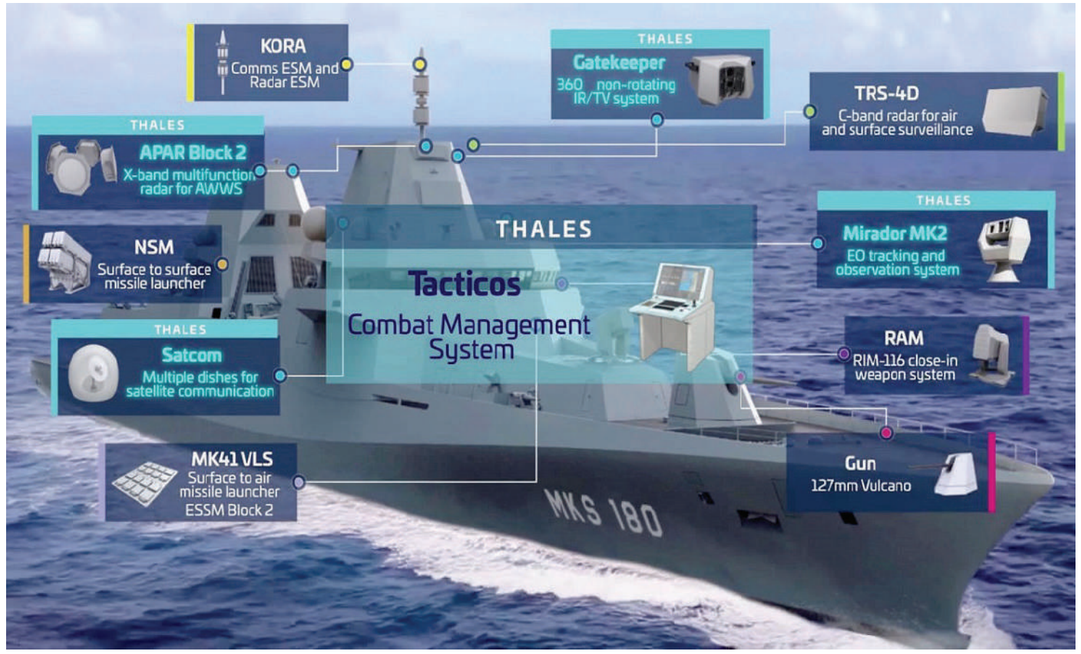
Further to the above, we find that the Middle East region receives its recent purchases of surface-to-surface missiles from five major countries (Russia - the United States - France - Italy - Sweden) despite the presence of other sources in the eastern half of the world, due to the fact that almost all purchases from the region's marine parts come from Western countries, and accordingly it is expected that the trend towards purchases during the next five years will continue in the same vein, but there are some signs that may give an indication of breaking this pattern, through the new relations that started some among countries of the region that are opening up through defense partnerships with companies from eastern countries, as is the case with the partnerships that took place between Emirati and South Korean defense companies, which may contribute to gradually opening other Gulf countries to the same partnerships, especially Saudi Arabia, which aspires to have a share in the national defense industries, coupled with significant exportation over the next ten years.

Greece and Naval Group Ink contract for 3 FDI HN frigates

On March 24, 2022, Greece and Naval Group signed the contracts for three defence and intervention frigates, plus one optional, and their in-service support. Two FDI HN (Hellenic Navy) will be delivered in 2025 and the third one in 2026.

In accordance with the defence agreement signed last October between Greece and France, the Hellenic authorities have signed two contracts with Naval Group for the supply of three Defence and Intervention Frigates (FDI HN), plus one optional, as well as their in-service support. The contracts include as well the supply of MU90 torpedoes and CANTO countermeasures.

The contracts were signed today in Athens by Vice-Admiral (rtd) Aristeidis Alexopoulos, General Director of the General Directorate for Defence Investments and Armaments, and Pierre Éric Pommellet, Chairman and Chief Executive Officer of Naval Group, in the presence of the Greek Minister of Defence, Nikolaos Panagiotopoulos and the French Minister of the Armed Forces, Florence Parly.



HENSOLDT and Thales join forces to equip F126 frigates

Contracted in 2020, F126 is the latest frigate programme for the German Navy. The F126 class will consist of four ships (with an option for two more ships); the program also includes multiple land-based test and training sites. The first frigate F126 is expected to be delivered to the customer in 2028. The entire programme will run for over ten years.

HENSOLDT's TRS-4D radar will be installed in its non-rotating version with four fixed-panel arrays. The integration of the radar on the ships and shore installations will be done by Thales to deliver a mission and combat system that complies with the German requirements.

First deliveries are scheduled for 2025. With this system, in combination with other systems and sensors onboard, F126 has the ability to operate in the most complex maritime environments, and therefore contribute internationally to securing safety and stability.

Radars of the TRS-4D product family are already in service in different versions onboard German Navy ships, among them the Frigate F125 and the Corvette K130 (second batch) and benefit from continuous product improvements and advantages with regards to spare part management and training. For this reason, TRS-4D NR has been pre-selected by the German Navy.

Poland launches Miecznik coastal defence frigate programme

The Polish Armaments Inspectorate (AI) ordered three coastal defence frigates on 27 July from a consortium led by Polska Grupa Zbrojeniowa (Polish Armaments Group, PGZ) under the Miecznik programme.

An artist›s impression of planned PGZ Naval Shipyard modernisation for Poland›s Miecznik coastal defence frigate programme. (PGZ)

An artist›s impression of planned PGZ Naval Shipyard modernisation for Poland›s Miecznik coastal defence frigate programme. (PGZ)

During the signing ceremony at PGZ Naval Shipyard in Gdynia, Polish Defence Minister Mariusz Błaszczak gave the programme timeline: "By the end of November, the consortium will prepare three designs. Afterwards, no later than the beginning of 2022, the best concept will be chosen. Then, the consortium will work on the final design and will build the vessel. Under the schedule, we would like to launch the first warship in four years."

PGZ spokesperson Jacek Zagozdzon told Janes on 2 August that the contract covers the entire Miecznik programme, from providing design concepts to delivery of the frigates.

A PGZ press release published after the ceremony stated three frigates would be built in Polish shipyards and delivered by 2034. The estimated value of the order is roughly PLN8 billion (USD2 billion). AI spokesperson Major Krzysztof Płatek told Janes on 28 July that this amount would cover "all programme costs, including weapon systems, the integrated combat system, logistics, and training".

Poland›s Technical Modernisation Programme 2021–35 foresees the procurement of three frigates capable of engaging both aerial and naval threats and able to operate in Polish territorial waters as well as support NATO blue water operations.

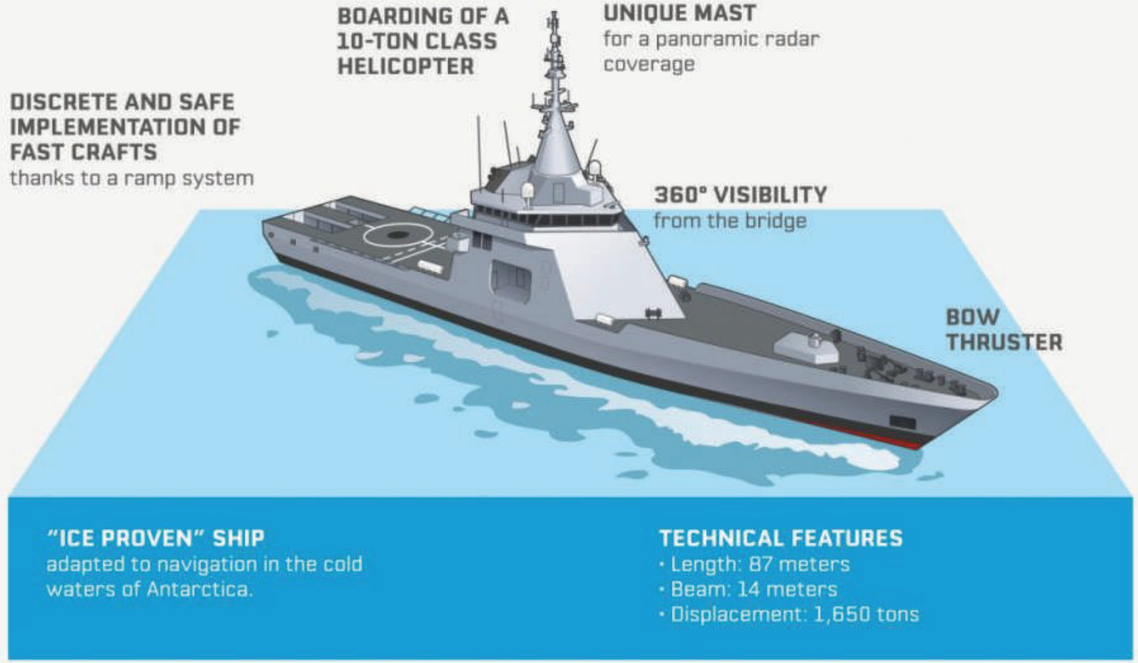
Naval Group delivers the 4th and final OPV 87 to Argentina

A.R.A. Contraalmirante Cordero has been delivered to the Argentine Navy today in Concarneau in the presence of Francisco Cafiero, Secretary for International Defence Affairs at the Argentine Ministry of Defence, Vice Admiral Enrique Antonio Traina, Deputy Chief of Staff of the Argentine Navy and Alain Guillou, EVP International Development at Naval Group. It is part of the contract signed by Naval Group with Argentina in 2019 for the supply of four Offshore Patrol Vessels (OPV).

Photo from the delivery ceremony held in Naval Group facilities in Britanny

The A.R.A. Contraalmirante Cordero is the last vessel of the series and its delivery marks the success of a program that has met all its deadlines: the A.R.A. Bouchard (ex-L'Adroit) was delivered in December 2019 two months ahead of schedule, and the second and third offshore patrol vessels A.R.A Piedrabuena and A.R.A Storni were delivered in April and October 2021, in line with the original schedule.

This success was made possible thanks to the close collaboration between Naval Group, Kership and Piriou, who worked side by side with the Argentinean Navy. The excellent overall customer satisfaction rate, measured at 97%, confirms the excellent conduct of this program.



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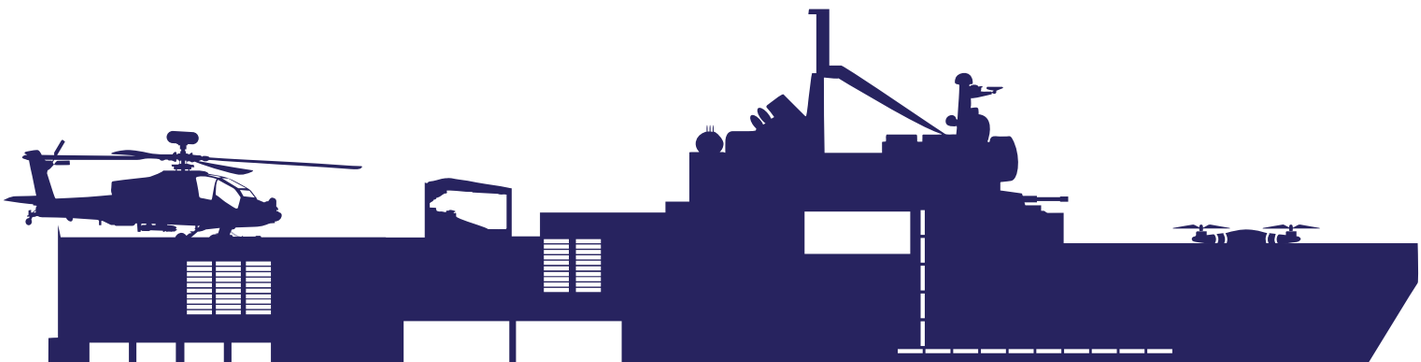

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