MBDA

MISTRAL

FAMILY OF VSHORAD SYSTEMS

MISTRAL FAMILY

Recent conflicts and operations have demonstrated the overarching importance of an efficient and robust force protection capability as a prerequisite for all deployments. The increasing diversity and complexity of air threat makes this requirement even more important today for land, sea and air operations.

The MISTRAL 3 is a versatile multi domain, multi platform (army, navy and air) combat proven missile offering a comprehensive protection capability against a wide range of threats as demonstrated by a success rate over 96%. Its performances have been constantly improved through the development of new versions of the missile bringing more range, outstanding performances against challenging targets (high speed, complex manoeuvres, modern IRCM) and new capabilities such as those demonstrated against small drones and fast surface attack crafts (FIAC and RIBs).

The MISTRAL has proven to be a very reliable, easy to maintain and easy to operate missile system. Fitted on a large number of platforms and through various configuration and systems, including the manually operated version the MISTRAL offers a unique flexibility and scalability to meet the most challenging operational requirement on land, at sea and in the air for the protection at unit and force level.

The MISTRAL is not only a missile, but above all a complete ecosystem. Centred on the missile, this ecosystem proposes a wide range of capabilities:

- Multiplatform: ground, navy, airborne
- Manual or remote controlled launchers
- Integration to any Command and Control system, from MBDA LICORNE C^2, MBDA VL MICA TOC, or indigenous C^2

MISTRAL EVOLUTION

2024

Third step

Small, fast and agile vessels capabilities
Improved capabilities against UAVs

2022

Second step

Improved range up to 8km

2019

First step

'A new missile in the same shell'

- IR sensor
- Improved sensibility, range and speed immune to preventive and reactive flares
- 20 years life time without mid-life activities

2013

MISTRAL 3

2004

MISTRAL 1 Block 1

Missile improvement programme

1998

MISTRAL 2

- Manoeuvrability improvement
- Laser proximity fuse
- Flares resistance

1990

MISTRAL 1

- First generation

Mistral 3 is the latest step of the constant MISTRAL improvements to cope with new and future threats

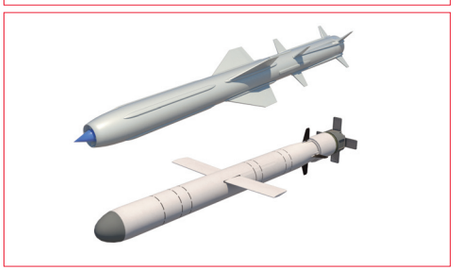
COMBAT PROVEN

Wide target spectrum

Fighter jets
Fast, agile, stealthy

Large aircraft

Cruise missiles
Sea-skimming
anti-ship missiles
Supersonic and subsonic



Helicopters and slow movers
Fast, agile, stealthy

RPAS/UAS/drones
Loitering munitions

FIACs
Small, fast and agile vessels

MISTRAL 3

ONE GENERATION AHEAD

The MISTRAL 3 is a versatile multi-domain, multi-platform (army, navy and air) combat-proven missile which offers comprehensive protection capability against a wide range of threats.

MISTRAL 3 is the latest version of a long success story that began in the early 90s, perfectly adapted to the threats of today and in the future.

MISTRAL 3 is a fire-and-forget missile, guaranteeing the same level of outstanding performances. Unlike beam-riding systems, the MISTRAL terminal accuracy on manoeuvring target is not dependent of the operator's skills and therefore doesn't need intensive and permanent training, whatever the gunner and the launcher.

Missile characteristics

- Length: 1.88m (incl. launch motor)
- Weight: less than 20kg
- Diameter: ~92mm
- High supersonic speed: (930m/s)
- Short interception time
- High manoeuvrability: up to 30g
- Interception range: up to 8,000m
- Interception altitude: up to 6,000m
- Min. interception range: 500m
- Intercept manoeuvring targets up to 9g
- Kill probability over 96%

Key characteristics

- Fire-and-forget
- Extremely sensitive matrix imager
- Powerful image processing
- Immune to all known countermeasures
- 3-axis manoeuvrability for high-accuracy guidance
- Laser proximity and impact fuse
- 3kg warhead
- Two stage solid propellant rocket
- 20 years lifetime without maintenance
- Qualified for use in extreme conditions -40C° to +71C

LICORNE C²

LIGHTWEIGHT WEAPON SYSTEM DEDICATED TO GBAD AND C-UAV OPERATIONS

LICORNE C² is a compact and lightweight C² that provides a full range of information to decision makers.

LICORNE C² is a compact and lightweight C² (command and control) that provides a full range of information to decision makers. LICORNE C² provides situational awareness on a wider threat spectrum 24/7, with the capability to integrate into a global air defence through tactical data link (L16, JRE or national protocol).

Adapted to manage a simultaneous variety, LICORNE is designed to manage a simultaneous threat variety of sensors like radar, electro-optical and EW, various types of soft kill (ie. jammer) and hard kill effectors (ie. missiles, lasers etc).

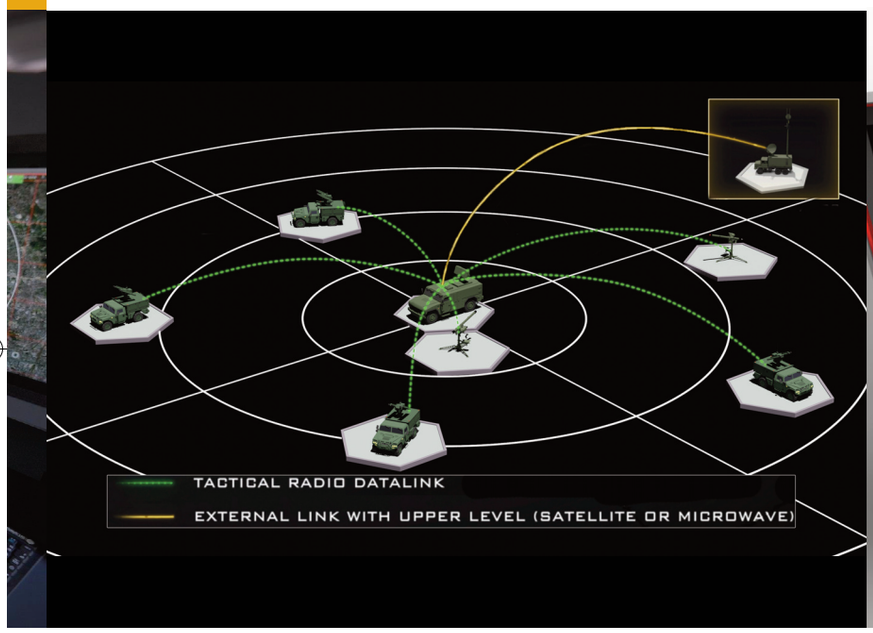
The LICORNE inherits more than 20 years of MBDA experience in Ground Based Air Defence systems (GBAD C²), with more than 70 GBAD systems sold over the world.

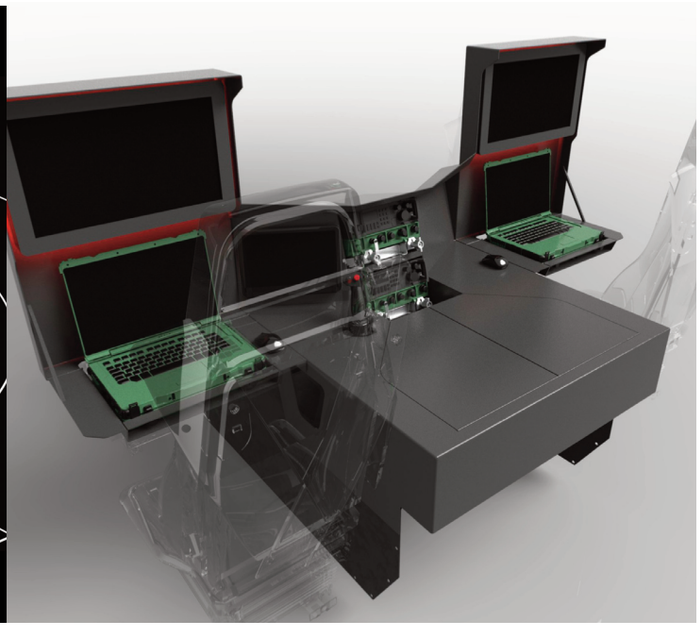
Product key features

- Flexible design allowing integration in vehicle, as well as disembarked solutions
- Management of the Threat Evaluation and Weapons Assignment (TEWA)
- Ready to be networked with a wide suite of sensors (radars, remote cameras and RF finders) and effectors (machine guns, jammers, DEW, UAVs, and all MISTRAL launchers)
- Easy to integrate in a wider defence network, thanks to tactical data link (JREAP-C or national)
- Compatible with ASTERIX and SAPIENT protocols

An agile configuration

- LICORNE C² configuration is tailored to customers' needs and mission; transportable version in boxes or integrated in vehicle
- Fully autonomous including GPU
- Wide suite of radar already integrated (SAAB G1X, ELTA ELM 2026B, RADA MHR, WEIBEL XENTA etc)
- Wide suite of effectors: MISTRAL launchers, jammers, drone killers and catchers
- Low manpower – only two operators are necessary for operation





Main characteristics

- Command and control of Air Defence (AD) operations
- Flexible configuration tailored to the mission
- Situational awareness through:
  - Local air picture from local radar(s) and other sensors
  - Collaborative LICORNE C²
  - Upper level shared air picture
- Integration within an overall AD structure thanks to the tactical data link
- Threat evaluation and prioritisation
- Management of engagement (policy, rules etc)
- Weapon coordination and target assignment:
  - Selection of the most appropriate effector
  - Cueing and control of effectors
- Control and display the engagement sequences until target neutralisation
- Friendly ergonomic interface

Additional integrated capabilities

- Centralisation and visualisation of the status of the subsystems
- Mission planning
- Embedded training
- Recording for training, operational post analysis and proof

MISTRAL ATLAS RC

VEHICLE MOUNTED REMOTE CONTROLLED AIR DEFENCE SYSTEM

MISTRAL ATLAS RC is a new MISTRAL launcher based on a remotely controlled turret and can be fitted with two or four MISTRAL missiles ready to fire. Equipped with the latest generation thermal sight and is capable of being mounted on a variety of vehicles ranging from light (SHERPA or URO VAMTAC ST5) to heavy vehicles (PANDUR, BOXER or STRYKER).

ATLAS-RC is MBDA's response to the requirement for a weapon system that combines high firepower (up to four MISTRAL ready to fire), short reaction time, day/night surveillance and engagement capabilities. It also offers tactical and strategic mobility, including force protection on the move, resulting in high-level crew protection and low maintenance constraints.

ATLAS RC can be operated in standalone mode, however it is natively designed to be coordinated by a C² such as MBDA's LICORNE C² through a combat radio network, allowing:

- Automatic slaving (azimuth and elevation) of the turret on the target designated by the C².
- Automatic data exchanges between the ATLAS RC and the C² like the engagement status, kill assessment information, ATLAS RC status, and ammunitions availability.

ATLAS RC, thanks to its simplicity of use, guarantees the full performance of the MISTRAL missile, whatever the target characteristics, high crossing speed, high elevation, very low signature.

ATLAS RC can also be remotely operated at distance for long-term deployment through a dedicated link.

MISTRAL ATLAS RC is equipped with the latest generation thermal sight and is capable of being mounted on a variety of vehicles ranging from light to heavy vehicles

Operational key features

- Able to fire two missiles in five seconds
- Low reaction time and reduced operator workload
- Force protection on the move
- Low manpower (two operators: gunner and team leader)

The ATLAS RC module

The solution for high flexibility missions.

- Can be installed wherever – on ground, on roof top for long term deployment
- Can be operated at long distance
- ISO standard module

Effectiveness

- Unlimited bearing x360°
- Elevation aiming from -10° to +55°
- Equipped with:
  - Infrared thermal sight for day/night operations
  - Inertial measurement navigation unit
  - IFF in option
- High autonomy 24/7
- High mobility
- High firepower, up to four MISTRAL missiles per launcher
- MISTRAL missile information displayed in ATLAS RC terminal
- Integrated tracker to ease the target detection and automatic turret slaving
- Easy to integrate on a wide range of vehicles
- Air transportable on aircraft such as A400M and C130

MISTRAL ATLAS

THE TWIN MISTRAL MANUAL LAUNCHER

Once the MISTRAL missile leaves the launcher, the firing team are ready to fire the second missile or move to another position.

ATLAS is a twin manual MISTRAL missile launcher, which can be mounted on vehicle or easily deployed on ground.

ATLAS is extremely easy to operate with its missile fire-and-forget system, much like the single missile launcher, MANPADS. The gunner simply needs to detect the target through the thermal sight, activate the MISTRAL seeker and fire after the missile is locked on the target.

ATLAS allows firing of two MISTRAL missiles in five seconds and two missiles reloading in less than 60 seconds. The effectiveness of MISTRAL ATLAS relying on terminal accuracy and high lethality, is independent from operator's skills and training level with beam-riding systems requesting accurate and constant aiming of the target.

Seated position of gunner provides stability and reduces fatigue to maintain readiness throughout the mission. It also aids in precision for easy target designations, whatever the target characteristics. This includes high crossing speeds and high elevation or manoeuvres.

As MISTRAL is fire-and-forget, once the missile leaves the launcher, the firing team are ready to fire the second missile or move to another position.

Advantages

- Unlimited bearing x 360°
- Elevation aiming from -10° to +50°
- Equipped with Infrared and visible thermal sight for day/night capability
- High autonomy – 24/7 with centralised batteries
- MISTRAL missile information displayed in thermal sight
- Deployable in standalone or coordinated with MBDA LICORNE C²
- Weapon terminal for team leader:
  - Display and record thermal sight video
  - Display of the tactical situation and manage exchanges with MBDA LICORNE C² or indigenous C²
- IFF capability in option

Operational key features

- Able to fire two missiles in five seconds
- Reloading of two missiles in less than 60 seconds
- Discreet and easy to deploy
- High mobility

MISTRAL MANPADS

THE LIGHTWEIGHT MISTRAL LAUNCHER PORTABLE AND EASY TO USE

MISTRAL MANPADS is a flexible and versatile man-portable launcher dedicated to the deployment of the combat-proven MISTRAL 3 fire-and-forget VSHORAD missile on ground, on vehicles or on a naval vessel.

The MISTRAL MANPADS is extremely simple to operate as the missile is fire-and-forget. The gunner only needs to detect the target through the thermal sight, activate the MISTRAL missile, and fire once the MISTRAL seeker is locked on the target. The effectiveness of MISTRAL MANPADS relying on terminal accuracy and high lethality is independent from operator's skills and training level, while beam-riding systems request accurate constant aiming of the target.

Seated position of gunner provides stability and precision for easy target designation, whatever target characteristics, high crossing speed, high elevation or manoeuvres. Moreover, as MISTRAL is fire-and-forget, once the missile leaves the launcher, the firing team is ready to move on another position or reload to engage a new target.

Once the missile leaves the launcher, the firing team is ready to move on another position or reload to engage a new target.

Technical characteristics

- Tripod weight: 22.5kg
- Unlimited bearing x360°
- Elevation aiming from -15° to +60°
- Transportable folded with backpack
- Equipped with Infrared and visible thermal sight for day/night capability
- High autonomy – 24/7 with centralised batteries
- MISTRAL missile information displayed in thermal sight
- Deployable in standalone or coordinated with MBDA LICORNE C²
- Weapon terminal for team leader:
  - Display and record thermal sight video
  - Display of the tactical situation and manage exchanges with MBDA LICORNE C² or indigenous C²
- IFF capability option

Operational key features

- Ready to fire in less than 60 seconds
- Reloading in less than 30 seconds
- Discreet and easy to deploy whatever the environment (mountain, roof top, urban environment, forest etc)
- High mobility

The stability of the tripod and comfortable seating position ensure the gunner has:

- better accuracy and detection capabilities
- reduced fatigue, to maintain a high level of readiness throughout the mission

COMBAT PROVEN

MISTRAL SIMBAD RC

REMOTELY CONTROLLED SELF-DEFENCE SYSTEM

MISTRAL SIMBAD-RC is an anti-air self defence system operating the very effective fire-and forget MISTRAL missile.

The system provides an extremely effective defence capability against all threats (anti-ship missiles, aircraft, helicopters as well as asymmetric surface threats). It has been optimised to handle a multi-threat scenario.

Thanks to its very small footprint, MISTRAL SIMBAD-RC can be installed on board a wide range of ships, from patrol boats up to support ships. It has been designed to conform to different combat system capabilities, from standalone to fully integrated.

Being fully controlled by a single operator from inside the vessel, the system offers 24/7 operational capability, even in adverse weather conditions and very high sea states. The system is therefore ideally suited to ships with low manning, as well as a complementary ILMS with excellent cost-per-kill ratio on bigger surface combattants.

MISTRAL SIMBAD RC is capable of providing the primary self defence capability for all warships, or as a complement to their main air defences.

Operational advantages

- Providing a highly effective and reliable last ditch defence against leakers or late appearing threats
- Easy to operate, minimum training requirement, easy to maintain, optimised for small crews
- Capable of defeating asymmetric surface threats
- The turret can be directly slaved to the ship's radar or electro-optical system
- Short system reaction time
- Fast and easy reloading at sea

Turret technical characteristics

- Turret weight: 480kg
- Bearing: +/- 160°
- Elevation aiming from -30° to +55°
- Loaded with 2 or 4 MISTRAL missiles
- Turret equipped with:
  - Double field of view thermal sight
  - Inertial measurement unit for stabilisation
  - Autonomous tracking system

Naval warfare capability

Especially designed for modern naval warfare, MISTRAL missile can cope with:

- Sea-skimming and manoeuvring anti-ship missiles
- Fighter aircraft
- Helicopters
- Small surface craft

System technical characteristics

- The system is designed to operate one or two turrets through a single user friendly compact terminal
- The compact terminal displays:
- Turret equipped with:
  - Thermal sight image
  - MISTRAL missiles information
  - Tactical situation from CMS
  - Orders from CMS
- Easy to integrate on a wide range of warships
- Easy to interface with ship's combat management system
- High autonomy – 24/7
- Simplicity of operation, low training and low maintenance
- Low manpower, only one operator needed to operate and two operators for reloading

MISTRAL ATAM

AIR-TO-AIR SYSTEM FOR HELICOPTERS BASED ON THE MISTRAL MISSILE

MISTRAL ATAM is characterised by simplicity of operation, a very low crew workload and a high level of performance.

MISTRAL ATAM is based on the MISTRAL missile with its fire-and-forget engagement mode, ease of operation and unrivalled kill probability. The system is based on two twin launchers, each fitted either side of the helicopter and deploying a total of four ready-to-fire MISTRAL missiles. The weapon can be connected to the helicopter's combat system when integrated onto a combat helicopter, or through simplified control equipment if installed on a multi-purpose helicopter.

In both cases, it is characterised by simplicity of operation, a very low crew workload and a high level of performance. The system can be operated within the whole flight envelope of the launch helicopter, at speeds of up to 200 knots and at altitudes exceeding 15,000 feet.

MISTRAL ATAM ensures a large off-boresight capability, together with the ability to aim the missile seeker very precisely at a given target. The missile has a shaped trajectory in order to intercept targets top-down or at long range, the crew can also select the proximity fuze mode.

MISTRAL ATAM is operated by the French Army Aviation on the Tiger attack helicopter. MISTRAL ATAM is already integrated onto India's HAL helicopters (DHRUV and LCH) and the integration is underway on the KMAH helicopter from KAI.

Operational advantages

- Four ready-to-fire MISTRAL missiles
- Unlimited flight envelope
- Adaptable to:
  - Helicopters
  - Light aircrafts
  - UAV
- Wide range of missions:
  - Self-protection in hostile environment
  - Protection of other platforms engagement
  - Ensuring dropping areas safety during air-mobile operations
  - Complementary surface to air projection force
  - Temporary defence of ground forces facing air threat (mobile air defence)
  - Mobile escort of convoys
  - Anti UAV/ISTAR warfare
  - Non-conventional air attack
- In full operational service

Ease of operation

- The lowest possible constraints for crew
- User friendly interface, no pitch-up manoeuvre before firing
- Automated engagement sequence
- Easy reload

Operational effectiveness

- Firing possible within the whole flight envelope (from NOE to 15,000 ft, from hovering to 200 knots)
- Very short reaction time lock-on and interception, even in dense clutter
- Large off-boresight capability

Modularity

MISTRAL ATAM can be mounted either on attack helicopters fitted with an integrated combat system (Tigre, Rooivalk) or on lightweight helicopters (Gazelle, Fennec) and utility helicopters (Cougar) as a standalone weapon system.

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