



Technical specifications - Pelixar MULE* series drones

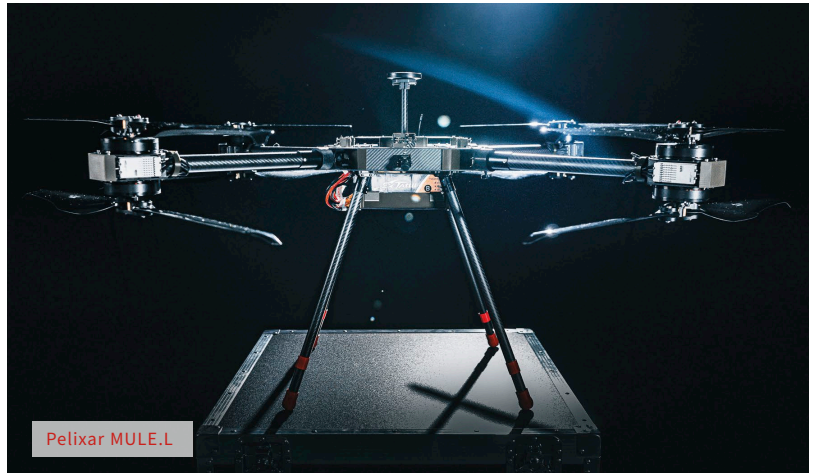
* Multifunctional Universal Lifting dronE



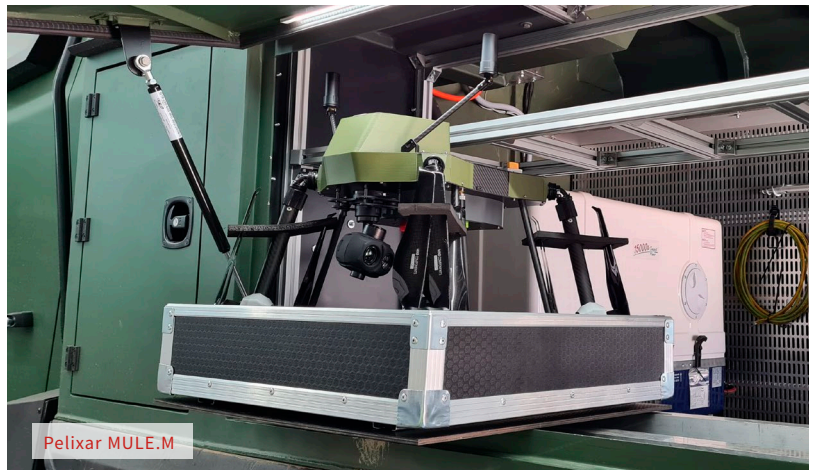
Universal Multi-Purpose Aerial Platforms Pelixar MULE .S .M .Lh .L .XL



Pelixar MULE.XL



Pelixar MULE.L



Pelixar MULE.M



Technical specifications Pelixar MULE series drones

Pelixar MULEs are advanced and proven multirotor multipurpose aerial platforms. The MULE series is divided in terms of maximum operational payload and flight time and range. All platforms offered are designed and manufactured by qualified Pelixar engineers, tests and technical verification have been repeatedly carried out in the working environment of our customers. The modularity of the design allows the installation of almost any functional and useful equipment.

MULE SERIES BASIC SPECIFICATIONS:

MULE Series	Recommended tasks	Flight power supply	Functional equipment	Weight of the platform	Maximum flight time	Cargo weight recommended	Maximum load weight
S	patrol, surveillance	6S battery	RGB zoom + Thermo	3kg	30min	1kg	2,5kg
M	patrol, survey, transport and cargo drop	2x 6S battery	RGB zoom + Thermo	5,5kg	30min	2kg	5kg
Lh	patrol, survey, transport and cargo drop	hybrid (generator + batteries)	RGB zoom + Thermo, skaner 3D	16kg	120min	6kg	12 kg
L	patrol, surveying, transport and cargo drop, towing	2x 12S battery	RGB zoom + Thermo	9,2kg	40min	10kg	20kg
XL	transportation and cargo drop, towing	4x 24S battery	any	75kg	35min	80kg	125kg

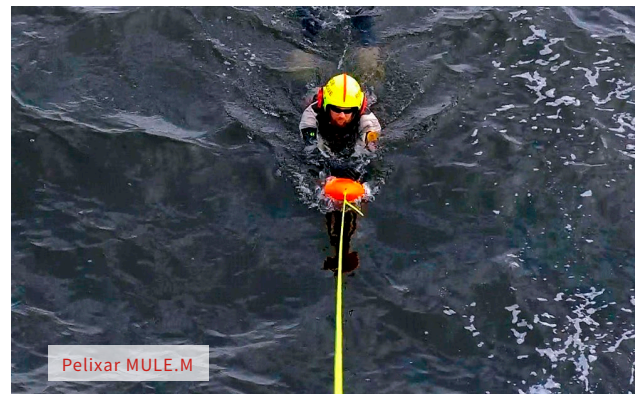
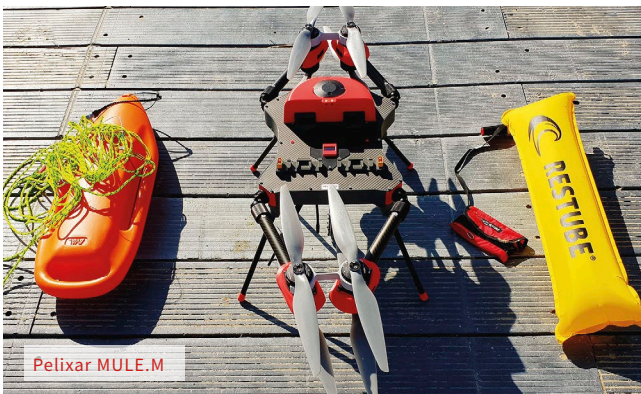




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GENERAL (COMMON TECHNICAL PARAMETERS OF MULE SERIES)

Drive configuration	X8 (8 propellers in coaxial arrangement, with full redundancy)
Upgrade provision <small>(maximum weight of additional customer equipment)</small>	50% maximum payload weight
Frequency of operation	Configurable according to requirements with required operational range: 2.4000-2.4835 GHz, 5.725-5.850 GHz, 868 MHz, 433 MHz
Hovering accuracy Loiter mode Optic Flow Mode <small>(depending on navigation system configuration))</small>	Vertical: ±0.1 m (optical positioning system enabled) ±0.5 m (GPS) ±0.1 m (RTK) Horizontal: ±0.3 m (optical positioning system on) ±1.5 m (GPS on) ±0.1 m (RTK enabled)
RTK positioning accuracy	RTK system enabled and operational: 1 cm+1 ppm (Horizontal) 1.5 cm + 1 ppm (Vertical) Pitch: 300°/s, Yaw: 100°/s
Maximum rotation speed	Pitch: 300°/s, Yaw: 100°/s
Maximum pitch angle	30° (Loiter mode)





Technical specifications Pelixar MULE series drones

GENERAL (COMMON TECHNICAL PARAMETERS OF THE MULE SERIES) TBC

Maximum climb rate (depending on the requirements and functional load, these values are selected optimally)	5 - 6 m/s
Maximum descent speed (vertical) (depending on the requirements and functional load, these values are selected optimally)	3-5 m/s
Maximum descent speed (at an angle) (depending on the requirements and functional load, these values are selected optimally)	7 m/s
Maximum forward speed	Adapted to the equipment and model of the platform
Cruising speed	43 km/h (12 m/s)
Maximum Above sea level ceiling.	5000 m
Wind resistance	Up to 80 km/h (22 m/s)
Maximum flight time	Depends on equipment and platform model
IP index (water and dust resistance)	Yes, Adapted to equipment and platform model
Satellite navigation system	<p>GPS (standard): GPS L1C/A, GLONASS L1OF, BeiDou B1I Operating temperature: -40°C to 85°C Processor: STM32F302 Frequency of updating the position: 8 Hz</p> <p>RTK (option): BDS B1I B2I, GPS L1C/A L2C, GLONASS L1OF L2OF, GALILEO E1B/C E5b, QZSS L1C/A L2C Operating temperature: -40°C to 85°C Processor: STM32F302 Frequency of updating the position: 8 Hz Anti-jamming</p>



Technical specifications Pelixar MULE series drones

GENERAL (COMMON TECHNICAL PARAMETERS OF THE MULE SERIES) TBC

Optical navigation

(For precise indoor positioning or in the absence of a satellite navigation signal)

Sensor optic flow based camera and lidar (optional): Infrared camera:

Camera range from 80 mm to oo

60 lux minimum

FOV 42°

Lidar:

Range up to 2 m

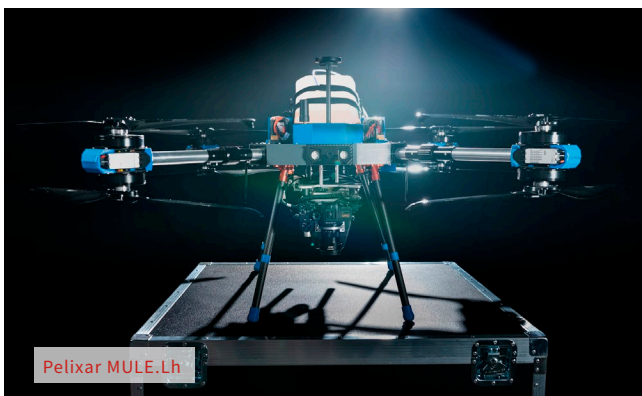
FOV 27°

Utility equipment

- Hitch midiCargo for 1x heavy load max 10kg (automatic or remote release)
- MiniCargo hitch up to 2x light load max 2kg (automatic or remote release)
- MultiCargo hitch up to 6x light load max 1kg (automatic drop and remote release)

Operating temperature

From -20°C to +45°C





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CONTROL EQUIPMENT

Frequency of operation	2.4000-2.4835 GHz , 5.725-5.850 GHz, 868 MHz, 433 MHz
Maximum transmission range (open area, free of interference)	Customized to customer requirements, up to 25 km
Operating temperature	from -20°C to +40°C

LIGHTING

Navigation lighting	LED, compliant with standards
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FLIGHT CAMERA (FPV)

Resolution	960p – 1080p – depending on the requirements
FOV (field of view)	145°
Number of frames	30 fps





Technical specifications

Pelixar MULE series drones

CONNECTIVITY AND NAVIGATION

Flight planning	Full automatic flight planning capability based on the flight plan (grid plan, circle plan, overflight plan, stopover points, determination of emergency landing area in distant missions, any plan defined by the operator)
Resistance to interference	Communication and control system is immune to interference from infrastructure and foreign transmitters
Takeoff and landing	Takeoff and landing can be fully automatic. The system is capable of landing on board marine vessels thanks to the high redundancy of INS and magnetic compass systems
Map server	The base station software allows the use of many open map servers such as GoogleMap, OpenStreetMap and WMS
Automatic scheduling	Ability to automatically plan measurement missions
Additional positioning systems (options)	<p>Optical positioning system - for precise hovering indoors or in environments without access to a GPS signal</p> <p>TOF positioning system - a positioning system based on transmitters placed indoors (e.g., in a warehouse) enabling continuous tracking and mission planning indoors without access to a GPS signal</p> <p>RTK - a precision satellite navigation system that enables centimeter accuracy of platform position determination</p> <p>Satellite compass- unique possibility of using a satellite compass resistant to magnetic interference. Particularly useful in urbanized environments where there is strong magnetic interference such as from infrastructure</p>



Applications and features Pelixar MULE series drones

APPLICATIONS

The Pelixar MULE series is an unmanned versatile and multi-purpose platform for various applications. Depending on the optional equipment, it can perform tasks for many different fields, from monitoring and reconnaissance, photogrammetric and remote sensing surveys, air composition measurements, infrastructure and wildlife monitoring, reconnaissance and contingency partolles, to transporting cargo, delivery of medical devices, to towing and transportation of people in water, ice or medical rescue. A unique feature of the products is also the ability to equip integration with any of the customer's sensors, thus further increasing the range of possibilities. The platform provides an excellent base for unusual applications and customer requirements. Each platform can be customized according to customer requirements. The manufacturer can equip the platform with additional dedicated and standardized power, signal and data transmission connectors, according to the customer's needs and requirements. The main goal of Pelixar S.A. engineers is to optimize each base design to the customer's specific requirements. In this way, we offer a maximally optimized solution that meets the customer's rigorous requirements, providing maximum operational features

FEATURES

The basic offer includes a dedicated serial MULE unmanned platform, control unit and control signal and video transmission link. The platform is fully configured, flown, commissioned and ready to fly. Depending on the optional equipment also on offer with integration and commissioning, the platform can be delivered with different versions of equipment. Importantly, the platform's flight settings and adjustments are optimized for each equipment version and maximize performance for the given task.





Examples of applications and functional versions - Pelixar MULE series drones



RESCUE VERSION (FOR WATER, ICE AND MOUNTAIN RESCUE)

- **Optional equipment:**

- RGB 4K zoom 10x recognition camera + Thermo SD;
- 3 remote-controlled mounts for carrying and dropping rescue equipment;
- Rescue pneumatic buoy;
- Rescue buoy or rescue belt;
- A survivor position indicator;
- A rescue means of indicating the position of a castaway;
- Towing kit for towing an injured person;
- Specialized hook for picking up persons and property.

- **Capabilities:**

- Automatic missions on the search grid plan (freely defined or predefined),
- Instant preparation and take-off of the Unmanned Aerial Vehicle for the rescue mission;
- Resistance to harsh operating conditions (dust, sand, precipitation and strong wind);
- Pneumatic buoy drop for the survivor,
- Precise administration of the rescue buoy or rescue belt to the hands of the castaway;
- Towing a castaway on the water;
- Precision passing of a rescue agent into the hands of a castaway or casualty;
- Passing or flipping a pilot rope;
- Position beacon drop in places inaccessible to the UAV (in mountains, on ice crags, at sea).
- Airdrop or administration of supplies or survival supplies for victims in the mountains;
- Instant transport of an Automated External Defibrillator to the scene of an accident;
- Instant transport of an CPR kit to the scene of an accident;
- Locating and searching for missing persons from altitude (life chain support,
- localization of victims in mountain rescue by day and night, search for the missing in forests and vast areas, support of SAR missions at sea,
- emergency reconnaissance and search for survivors at sea from a marine unit).



Examples of applications and functional versions - Pelixar MUL seriesE drones



MEASUREMENT VERSION (FOR PHOTOGRAMMETRIC AND REMOTE SENSING MEASUREMENTS)

- **Optional equipment:**

- Photogrammetric camera synchronized with flight computer with interchangeable lenses;
- Remote sensing cameras synchronized with the flight computer (10 spectral channels);
- Thermal camera synchronized with flight computer (separate thermal camera or multispectral camera with thermal channel (5 + 1));
- Sensor for measuring sunlight intensity with INS integrated with remote sensing cameras;
- Stabilized gimbal;
- Precision RTK satellite navigation system;
- Lidar laser scanners;
- Bathymetric scanners.

- **Capabilities:**

- Automatic survey missions on the plan of any mesh (freely defined or predefined survey grid);
- Photogrammetric measurements (orthophotomap, orthophotoplan, orthomosaic, spatial model with texture (mesh), point clouds, volume measurements);
- Remote sensing measurements - 10 spectral channels (indexed maps, NDVI, orthophotos in different spectral ranges, precision agriculture, detection of damage and blight in agricultural and forest land, detection and localization of nutrient and water deficiencies in crops).
- Measurements of photovoltaic farms (construction of maps for performance testing, inventory, condition monitoring, performance monitoring, panel surface condition testing, detection of electrical damage to panels and so-called hot spots, preventive inspections);
- Inventory of crime and traffic accident sites in investigations and legal proceedings;
- Bathymetric measurements;
- Laser scanning.



Possible functional versions and accessories - Pelixar MULE series drones



TECHNICAL MONITORING OR RECONNAISSANCE VERSION (FOR MONITORING, RECONNAISSANCE, IDENTIFICATION, SEARCH):

- **Optional equipment:**

- RGB 4K zoom 10x + Thermo SD surveillance camera;
- Long-range communication system for long-distance patrols;
- Automatic drone hangar;
- Interference-resistant tuned to target infrastructure communication and control system.

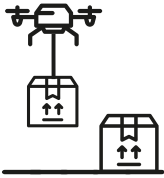
- **Capabilities:**

- Automatic patrol missions on an arbitrary grid plan (arbitrary or predefined measurement grid);
- Automatic landing and storage in the drone hangar;
- Rapid readiness for patrol (intervention) missions within port or critical infrastructure (so-called operational readiness maintenance);
- Monitoring of gas or liquid fuel transfer lines;
- Detection of gas leaks from critical infrastructure;
- Detection of fuel leaks in ports;
- Automatic drone hangar system (precise hangar landing, automatic storage).



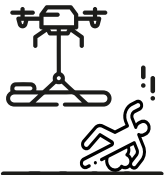


Possible functional versions and accessories - Pelixar MULE series drones



LOGISTICS VERSION (FOR TRANSPORT AND CARGO DROP)

- **Optional equipment:**
 - RGB 4K zoom 10x + Thermo SD surveillance camera;
 - Long-range communication system for long-range flights;
 - Cargo hook for heavy cargo (automatic drop and remote hitch);
 - Cargo hook for light cargo (automatic drop and remote hitch);
 - Multi-chamber hitch for 6 loads (automatic drop and remote hitch);
 - Ropes and slings for cargo transportation.



HEAVY VERSION (FOR MEDICAL EVACUATION OF THE WOUNDED, TRANSPORT OF PEOPLE OR HEAVY LOADS)

- **Optional equipment:**
 - RGB 4K zoom 10x + Thermo SD surveillance camera;
 - Long-range communication system for long-range flights;
 - Satellite compass;
 - Cargo hook for heavy loads;
 - Transport stretcher;
 - Ropes and slings for cargo transport.