Clymene

MODULAR UNMANNED VTOL AIRCRAFT CONCEPT

Designed in Europe. Built for Patagonia.

Clymene is a modular heavy-lift VTOL aircraft concept for logistics, inspection, and research in remote or high-risk areas.

Its coaxial-rotor configuration, robust propulsion, and software-defined architecture ensure safe and efficient unmanned operations.

Built from advanced composites, Clymene combines endurance and adaptability to serve industrial, energy, and defense missions in the world's most demanding environments.

1. Concept Overview

Clymene is designed to maintain operational continuity where ground or crewed air transport is limited by distance, terrain, or safety conditions.

All core systems are integrated into a reconfigurable platform that adapts in minutes to cargo, sensing, or research payloads.

The coaxial bi-rotor layout maximizes lift efficiency and stability in heavy-lift missions, maintaining control in strong winds and at high altitude within a compact footprint.

2. Key Performance Data

Parameter	Unit	Value
Maximum take-off weight	kg	1 250
Useful payload	kg	up to 460
Range	km	425
Endurance	h : min	2 : 50
Maximum speed	km/h	220
Operating temperature	°C	−40 to +40
Wind limit	km/h	54
Hover ceiling (out of ground effect)	m	2 750

3. Propulsion and Rotor System

A light turboshaft engine in the 500-horsepower class powers a coaxial rotor with three blades per rotor and an eight-meter diameter.
This configuration delivers high lift efficiency, redundancy, and precise control in turbulent or high-altitude conditions.
The propulsion system is engine-agnostic, allowing integration of equivalent units to meet mission or regulatory requirements, and provides endurance beyond the limits of current battery technology.

4. Modular Design and Architecture

Mission modules can be exchanged in under ten minutes using quick-mount anchoring points.
Available payloads include cargo bays, sensor pods, LiDAR scanners, and research instruments.
The aircraft is transportable in standard ISO 668 forty-foot intermodal containers with an internal length of 12.03 meters.
It can also carry payloads mounted in lightweight air-freight containers of IATA LD-series standards, ensuring interoperability across multimodal logistics networks.
The airframe, built from corrosion-resistant materials, withstands offshore, desert, and polar environments.
Clymene separates airframe-specific electronics from its modular autonomy layer, the Clymene Autonomy Core.
New functions can be deployed through software updates instead of hardware redesign, reducing downtime and accelerating innovation.
The platform is swarming-ready, supporting coordinated multi-aircraft operations through networked command and data sharing.

5. Payloads and Mission Profiles

Clymene supports modular payloads for logistics, sensing, and inspection:

- Cargo modules for sealed or underslung loads up to 460 kg
- Stabilized EO/IR gimbals for day-night visual missions
- LiDAR or multispectral mapping sensors
- Thermal imaging for industrial inspection
- Research bays for environmental or atmospheric data

Typical missions include energy and mining logistics, infrastructure inspection, environmental monitoring, border surveillance, emergency resupply, and scientific expeditions.

6. Data Link and Interoperability

A secure encrypted data link connects the aircraft and the mission control station for real-time telemetry and video.
The communication architecture supports line-of-sight and extended-range operations through modular radio or satellite links.
The Autonomy Core uses open standards to integrate seamlessly with command systems, fleet managers, and industrial monitoring platforms.

7. Operational Envelope

Clymene maintains stable hover and control in crosswinds up to 54 km/h and at density altitudes above 3 000 m.
Its wide temperature tolerance (−40 to +40 °C) and corrosion-resistant structure enable operation in mountain, desert, offshore, and polar environments.

8. Certification and Safety Framework

Clymene follows aerospace quality principles aligned with AS / EN 9100 and EASA UAS frameworks.
The program targets compliance with Light Unmanned Operator models for civil and governmental use in European and international airspace.
All systems apply safety design methods derived from manned aviation standards.

9. Development Roadmap

Phase	Year	Description
Concept definition	2025	Aerodynamic modeling, system architecture, and design validation
Scaled flight demonstrator	2026	Integration of the Clymene Autonomy Core on a reduced-scale prototype
Full-scale prototype	2027	Assembly, ground testing, and regulatory sandbox operations
Operational deployment	2028 and beyond	Industrial trials and certification with EASA and ANAC

The roadmap and milestones are indicative and will evolve in coordination with industrial and institutional partners.

10. Operational Support

Clymene provides comprehensive support from setup to deployment, including operator training, maintenance protocols, and digital fleet monitoring.
Field assistance and remote diagnostics ensure high availability in isolated regions.

11. Advantages

- High payload capacity in a compact airframe
- Stable performance in wind and altitude extremes
- Fully modular configuration transportable in ISO 668 containers
- Compatibility with IATA LD-series air-freight containers
- Reliable turboshaft propulsion with extended endurance
- Swarming-ready architecture for coordinated missions
- Autonomy-ready software enabling continuous evolution
- Secure encrypted data link with open integration interfaces
- Corrosion-resistant composite airframe for harsh environments
- Developed under aerospace-grade safety and quality standards

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