



# Drone Regulation and Operational Practice in Europe

— From Military to Civilian Applications —

## 《 Article Overview 》

This report provides an overview of the European Union’s drone regulations and policies and, by comparing them with the corresponding Japanese framework, identifies the structural characteristics of each system. It also examines the practical use of drones by EMSA, Frontex and EFCA, and reviews the activities of leading European companies such as TEKEVER, in order to capture the regulatory, operational and industrial landscape of drones in Europe.

### Chapter 1 — EU Drone Regulation

- Within a common regulatory framework, the EU has developed an integrated system covering drone operations, certification and remote pilots.
- The European Drone Strategy 2.0 and the Action Plan on Drone and Counter-Drone Security complement this framework by addressing both industrial promotion and security concerns.

### Chapter 2 — Comparison of Japanese and EU Drone Regulations

- The EU has a relatively centralised regulatory architecture built on a common body of rules.
- Japan, by contrast, follows a distributed approach, with the Civil Aeronautics Act, the Act on Prohibition of Flight of Small Unmanned Aerial Vehicles, the Radio Act and other legislation administered by several different ministries.

### Chapter 3 — Drone Operations by EU Maritime Authorities

- EMSA, Frontex, and EFCA use drones for maritime surveillance, border management, fisheries monitoring, and similar tasks.
- Drones complement existing surveillance and enforcement tools such as ships, manned aircraft, satellites, and coastal radar.

## **Chapter 4 — Trends among European Drone Companies**

- This chapter outlines companies such as Portugal's TEKEVER and reviews case studies in which their products and services have been deployed.
- The drone industry now offers an integrated package of services that spans airframe manufacturing, AI, sensors, communications, data processing, and operational support.

## 《 Article 》

### Introduction

Drones have appeared in the news with increasing frequency in recent years. Unmanned aerial vehicles — UAVs, or simply “drones” in common usage — were originally developed for military purposes, including as target drones and reconnaissance platforms, but they are now firmly embedded in civilian life as well, and their importance continues to grow.

In the military and security sphere, the war in Ukraine and developments in the Middle East have shown drones being used for reconnaissance, surveillance, target acquisition, attack, and the intimidation or disruption of critical infrastructure. They have become one of the key tools of modern armed conflict. At the same time, drones are now widely used in civilian settings — for aerial monitoring, infrastructure inspection, disaster response, transport and logistics, environmental observation and more — and the range of applications continues to expand.

Despite the diversity of these use cases, drones rest on a common technological and industrial foundation: airframes, sensors, communications, AI, command-and-control and traffic management, data processing, manufacturing capacity and skilled personnel. In other words, drones are no longer purely a defence technology, nor are they only a civilian tool. They are an enabling technology that can be deployed along a continuous spectrum — from everyday civilian use, through disaster and crisis response, public safety and border management, to defence applications in wartime — with military and security use as one prominent point on that spectrum.

For this reason, future drone policy needs to treat research and development, manufacturing, procurement, operations, workforce development, data sharing, regulation and counter-drone capabilities as an integrated whole. Drones bring real convenience and economic value, but they can also be used to surveil, disrupt, intimidate or attack airports, ports, energy facilities, telecommunications infrastructure and border areas. Given this dual character, the central question for any future policy or regulatory framework is how to balance flexibility — so as not to stifle innovation or industrial growth — with the practical effectiveness needed to address misuse and abuse.

These concerns are clearly reflected in European policy. The EU is expanding civilian drone use and building a market, while also strengthening external border management, critical infrastructure protection, public safety responses and counter-drone capabilities. At sea, drones are now used for coast guard duties, maritime surveillance, fisheries enforcement, marine pollution monitoring, action against smuggling and irregular migration, search and rescue, and the protection of ports and offshore critical infrastructure. They are increasingly important as a complement to ships, manned aircraft, satellites and coastal radar.

Against that background, this report surveys the regulation, operational practice and industrial dynamics of drones in Europe. Specifically, it provides an overview of EU-level rules and policies, then compares them with the Japanese system to highlight differences in regulatory authority, legislative

structure and administrative responsibility. It also examines how EMSA, Frontex and EFCA use drones in practice, and considers companies — particularly Portuguese companies — and their products and services, in order to show how drone technology cuts across civilian, defence, security and maritime surveillance domains.

## Chapter 1: The Regulatory Environment for UAVs in the EU

### 1.1 The EU Legal Framework

#### (1) The Regulator: EASA

In the EU, the European Union Aviation Safety Agency (EASA) is the principal body responsible for civil aviation safety and rule-making, working in close cooperation with national aviation authorities [\[1-1\]](#). Its tasks centre on standardisation, certification, regulation and oversight. EASA derives its regulatory authority over civil aviation from Regulation (EU) 2018/1139, which sets common rules in the field of civil aviation safety [\[1-2\]](#). A 2018 amendment extended that authority to civilian drones of all sizes, with the result that disciplines historically applied to manned aircraft — certification, maintenance, pilot licensing and operations — now apply to drones as well [\[1-3\]](#).[\[1-1\]](#)[\[1-2\]](#)[\[1-3\]](#)

#### (2) U-Space Airspace and the Division of Powers

To integrate civilian drones into existing airspace, the EU has established a regulatory framework for so-called U-Space airspace under Commission Implementing Regulation (EU) 2021/664. The actual designation of specific U-Space areas, however, falls within the competence of the Member States, producing a two-tier structure: a common framework at the EU level and airspace designation at the national level. This division reflects the fact that the use of national airspace lies at the heart of state sovereignty and must, in a union of sovereign states, remain a national prerogative.

#### (3) The Legislative Landscape

The legislation that applies specifically to unmanned aircraft systems (UAS) — that is, the drone itself and supporting systems such as ground control and communications links — is anchored in a set of 2019 regulations and a further set of 2024 regulations. The 2019 instruments establish the basic framework for UAS operations and certification; the 2024 package extends that framework by adding requirements for certified UAS and for innovative air mobility (IAM), which includes manned VTOL aircraft. The principal provisions of the 2024 package have applied since 1 May 2025.

#### (4) The 2019 Regulations

The 2019 framework consists of two legal instruments:

- **Commission Implementing Regulation (EU) 2019/947 sets out the requirements and procedures for UAS operations — for example, operator registration, remote pilot competence, and operational risk assessment [\[1-4\]](#). It establishes the basic framework for safe UAS operations within the EU and has applied since 31 December 2020. [\[1-4\]](#)**

- **Commission Delegated Regulation (EU) 2019/945 sets out the technical certification requirements, covering design, manufacture and maintenance, and rules on operations from third countries [\[1-5\]](#). It addresses the certification of UAS and their remote pilots, and has applied since 1 July 2019. [\[1-5\]](#)**

## **(5) The 2024 Regulations**

Adopted in April 2024, this further set of regulations addresses drones and vertical take-off and landing (VTOL) aircraft, and lays down the final rules for the launch of innovative air mobility (IAM) [\[1-6\]](#). Its scope is broad and runs in two directions. First, for manned electric air taxis, sometimes referred to as “flying cars”, it establishes comprehensive requirements across the four pillars of manned aviation: operating rules (Air OPS), pilot licensing (FCL), the standardised European rules of the air (SERA) and air traffic management (ATM). Second, for unmanned drones, it lays down standards and procedures for airframe certification and maintenance. [\[1-6\]](#)

The drone-related part of this 2024 package is made up of the following instruments:

- **Commission Delegated Regulation (EU) 2024/1107:** detailed rules on the continuing airworthiness of certified UAS and their components, and on the approval of organisations and personnel involved in those activities [\[1-7\]](#).
- **Commission Delegated Regulation (EU) 2024/1108:** rules on the initial airworthiness of UAS subject to certification, and on UAS and their operators from third countries [\[1-8\]](#).
- **Commission Implementing Regulation (EU) 2024/1109:** requirements and administrative procedures for the competent authorities responsible for the certification, oversight, and enforcement of the continuing airworthiness of certified UAS [\[1-9\]](#).
- **Commission Implementing Regulation (EU) 2024/1110:** rules on the initial airworthiness of UAS subject to certification, together with rules and procedures for UAS operations [\[1-10\]](#).
- **Commission Implementing Regulation (EU) 2024/1111: operational requirements for manned aircraft with vertical take-off and landing capabilities. The regulation covers manned eVTOL aircraft, and provides interpretations, supplements, and amendments to all of the existing rules on the airworthiness, operation, and pilot licensing of such aircraft [\[1-11\]](#). [\[1-11\]](#)**

## **1.2 Complementary Policy Documents**

### **(1) The Overall Picture**

Alongside the binding legislation, the European Commission has issued two policy documents — non-binding instruments that set out policy direction [\[1-12\]](#)[\[1-14\]](#). The European Drone Strategy 2.0 focuses on industrial promotion and market creation, with the aim of supporting the development of the European drone market; the Action Plan on Drone and Counter-Drone Security is concerned with the threat posed by malicious drones. The two are complementary: the former is essentially industrial policy, while the latter is essentially security policy. [\[1-12\]](#)[\[1-14\]](#)

### **(2) European Drone Strategy 2.0**

While European Drone Strategy 2.0 also touches on regulation, its emphasis is on creating the conditions in which drone-related services can become commercially viable in Europe and on expanding that market — in other words, industrial promotion and market creation [\[1-12\]](#). The Strategy aims to establish Europe as a lead market for civilian drones; the European Commission asserts that the comprehensive set of rules already adopted — described by the Commission as “the most advanced in the world” — will help launch that market [\[1-13\]](#). The Strategy also envisages that, by 2030, tasks such as emergency response, surveying, imaging, inspection and monitoring will routinely be carried out by drones. Among its main initiatives are new training and competence requirements for remote pilots and VTOL pilots, and a counter-drone package.[\[1-12\]](#)[\[1-13\]](#)

### **(3) The Action Plan on Counter-Drone Security**

#### **(i) Overview and the Four Priorities**

Adopted in February 2026, the Action Plan on Drone and Counter-Drone Security aims to set out a common EU approach to the threat posed by malicious drones [\[1-14\]](#)[\[1-15\]](#). Its main focus is on civilian internal-security tasks carried out by police forces and border management agencies — protecting critical infrastructure such as airports, power plants and government buildings; securing land and maritime borders; and ensuring public safety at large public events and in urban environments. At the same time, the Action Plan also supports the defence sphere and is intended to foster synergies between civilian and military applications, including dual-use applications. It is structured around four priorities: (1) preparedness and response capacity for drone incidents, a generic term covering the unauthorised entry, crash or attack of a drone and similar events requiring a response; (2) the detection of suspicious drones; (3) cooperation between the relevant authorities in dealing with such incidents; and (4) strengthening Europe’s defence posture against drone threats.[\[1-14\]](#)[\[1-15\]](#)

#### **(ii) The Counter-Drone Deployment Initiative**

The third priority — interagency cooperation in handling incidents — contains several particularly noteworthy elements. While the Action Plan emphasises that responding to incidents is primarily a matter for the Member States, it nonetheless sets out several specific lines of action for the European Commission itself [\[1-14\]](#). One of these is a Counter-Drone Deployment Initiative for the protection of critical infrastructure and the EU’s external borders, which earmarks €250 million for land and maritime border surveillance. The Commission also intends to support Frontex’s use of drones for border surveillance through joint operations, the deployment of drone pilots and counter-drone personnel, and demonstrations of new technologies.[\[1-14\]](#)

#### **(iii) Civil-Military Integration and Dual Use**

Under the fourth priority — strengthening Europe’s defence posture against drone threats — the Action Plan sets out a direction in which drone and counter-drone technologies developed in the civilian sector are leveraged to build military capability. It envisages stronger civil-military cooperation through existing funding mechanisms such as Horizon Europe, the European Defence Fund (EDF), the European Defence Industry Programme (EDIP), and SAFE loans; the mapping of civil-military industry; the development of certification schemes for counter-drone systems; the creation of foundations for a European Drone Defence Initiative and an Eastern Flank Watch; and the building of an industrial

ecosystem for next-generation drones through a Drone Alliance with Ukraine [\[1-14\]](#)[\[1-15\]](#).

#### **(iv) The Legislative Outlook**

The Action Plan also identifies forthcoming legislative initiatives on drones [\[1-14\]](#)[\[1-15\]](#). First, the European Commission plans to put forward a “Drone Security Package” later this year to improve the identification and registration of civilian drones. Second, the Commission intends to launch a feasibility study on an EU-level counter-drone regulatory framework.[\[1-14\]](#)[\[1-15\]](#)

## **Chapter 2: The Regulatory Environment for UAVs in Japan, in Comparison with the EU**

### **2.1 The Japanese Legal Framework**

Japan has not adopted a single, comprehensive regulatory regime of the EU type. Instead, it follows a distributed model, in which several ministries each administer their own areas of legislation. At the centre of the system is the Civil Aeronautics Act, administered by the Ministry of Land, Infrastructure, Transport and Tourism (MLIT). It introduced drone-specific rules in its 2015 amendment and has since been amended several times. Around it sit other instruments that operate concurrently: the Act on Prohibition of Flight of Small Unmanned Aerial Vehicles, administered by the National Police Agency; designations of relevant defence-related facilities issued by the Ministry of Defense; the Radio Act, administered by the Ministry of Internal Affairs and Communications; and the Civil Code, the Road Traffic Act, the Act on the Protection of Personal Information, and various local-government ordinances [\[2-1\]](#)[\[2-2\]](#)[\[2-4\]](#)[\[2-14\]](#). Where the surrounding area of a designated facility extends into the sea, the Regional Coast Guard Headquarters Commandant may also be involved in the notification procedures under the Act on Prohibition of Flight of Small Unmanned Aerial Vehicles. The Civil Aeronautics Act applies to unmanned aircraft weighing 100 g or more and provides for airframe registration, including mandatory Remote ID; the permission and approval system for specified flights; national pilot licensing, namely the first- and second-class unmanned-aircraft pilot licences introduced in December 2022; and an airframe certification scheme [\[2-6\]](#)[\[2-15\]](#). Flight categories are defined according to whether access-control measures are in place and whether visual-line-of-sight (BVLOS) flight over populated areas — “Level 4” — is permitted. In 2024, a new “Level 3.5 flight” category was created, easing the requirements for operations over unpopulated areas [\[2-5\]](#).[\[2-1\]](#)[\[2-2\]](#)[\[2-4\]](#)[\[2-14\]](#)[\[2-6\]](#)[\[2-15\]](#)[\[2-5\]](#)

### **2.2 Comparison with the EU System**

#### **(1) Regulator and Division of Powers**

In the EU, EASA — working in cooperation with national authorities — is the central body underpinning the development and implementation of common rules on civil aviation safety. UAS also fall within this common framework, which covers operations, certification, pilots and airworthiness. In Japan, by contrast, responsibilities are split: civilian use sits with MLIT’s Civil Aviation Bureau; the protection of critical facilities sits with the National Police Agency; defence facilities sit with the Ministry of Defense;

and radio use sits with the Ministry of Internal Affairs and Communications. Operators must therefore navigate the overlapping application of multiple statutes [\[2-1\]\[2-2\]\[2-4\]\[2-14\]](#). Compared with the EU’s relatively integrated framework, the Japanese system is more vulnerable to administrative fragmentation, but it also allows decisions to be tailored to the specialist expertise of each domain. [\[2-1\]\[2-2\]\[2-4\]\[2-14\]](#)

## **(2) Legislative Form and Degree of Integration**

Through the 2019 regulations — the operations and certification regulations — and the 2024 package — five regulations covering continuing airworthiness, initial airworthiness, manned-VTOL operations and related matters — the EU has built an integrated framework that regulates drones and innovative air mobility, including manned eVTOL, as a single whole. Japan has responded incrementally through successive amendments to the Civil Aeronautics Act. Although work is under way on dedicated operational and type certification rules for flying cars, or manned eVTOL aircraft, in time for the 2025 Osaka Expo, there is as yet no comprehensive, eVTOL-specific instrument of the kind found in EU 2024/1111.

## **(3) Airspace Categories and Traffic Management**

The EU is creating a new airspace category — U-Space airspace — and developing the common foundations needed to integrate large numbers of simultaneous drone operations and autonomous drones into existing airspace, although the actual designation of U-Space areas remains a national competence. Japan, for its part, issued “Guidelines for the Simultaneous Operation of Multiple Unmanned Aircraft” in March 2025, permitting a single pilot to operate up to five drones at once [\[2-5\]](#). The full development of a Japanese counterpart to U-Space — including dynamic management of low altitude airspace, continuous reference to Remote ID and automatic collision avoidance — still lies ahead. [\[2-5\]](#)

## **(4) Critical-Facility Protection and Counter-Drone Regulation**

The EU’s Action Plan on Drone and Counter-Drone Security (adopted in February 2026) focuses on civilian internal-security tasks — covering critical infrastructure, border security, and the protection of citizens — and seeks to build a common EU response, including the €250 million Counter-Drone Deployment Initiative. Japan’s Act on Prohibition of Flight of Small Unmanned Aerial Vehicles applies to such sites as the National Diet Building, the Prime Minister’s Office, the Imperial Palace, airports, nuclear power plants, and defence-related facilities, currently establishing a no-fly zone of approximately 300 metres around them [\[2-2\]\[2-3\]\[2-4\]](#). In March 2026, the Cabinet approved a draft amendment to the Act that would expand this radius to roughly 1,000 metres and would allow penalties to be imposed without first requiring a police order [\[2-5\]\[2-7\]](#). Japan, like the EU, is therefore moving towards stricter regulation in light of the growing threat capabilities of drones — but it is doing so by tightening domestic legislation focused on the protection of its own critical facilities, rather than by building a region-wide common framework of the EU type.

## **(5) Industrial Policy and Market Creation**

Through European Drone Strategy 2.0, the EU is concentrating on industrial promotion and market

creation: building an environment in which drone-related services can become commercially viable, and expanding that market with the aim of establishing a lead market. Japan has also been laying the regulatory groundwork under its “Roadmap for the Aerial Industrial Revolution” — lifting the ban on Level 4 flight in 2022, introducing the national licensing system, and establishing the airframe certification regime [\[2-6\]](#)[\[2-15\]](#). More recently, the use of unmanned assets in defence, including the SHIELD initiative, with roughly ¥312.8 billion budgeted for fiscal year 2026 [\[2-10\]](#)[\[2-13\]](#), and the strengthening of the domestic drone manufacturing base have become central issues in the revision of Japan’s three security-related strategy documents [\[2-8\]](#). Where the EU’s focus is on launching a civilian market, Japan is pursuing what amounts to a two-track strategy — advancing both the practical deployment of drones in civilian use and the build-up of capability in the defence domain.[\[2-6\]](#)[\[2-15\]](#)[\[2-10\]](#)[\[2-13\]](#)[\[2-8\]](#)

### **(6) Civil-Military Integration and Dual Use**

The EU Action Plan, while focused on the civilian domain, also supports defence and explicitly seeks to foster synergies between civilian and military applications. In Japan, social and institutional acceptance of dual-use technologies remains limited, and creating a smooth pipeline for transferring leading-edge civilian technologies to the defence sector is still a work in progress [\[2-11\]](#). That said, recent moves — the Ministry of Defense’s build-up of unmanned-asset defence capabilities and growing private-sector entry into the defence-equipment market [\[2-9\]](#)[\[2-12\]](#)[\[2-13\]](#) — point in a direction broadly similar to the EU’s civil-military integration.

## **2.3 Comparative Summary**

When the EU and Japanese systems are compared, the most striking differences fall under two headings: the degree of regulatory integration, and the sovereign constraints on institutional design. On the first point, the EU pursues integrated regulation through unified instruments, whereas Japan relies on distributed arrangements organised around individual ministries. On the second, the EU — as a union of sovereign states — must operate a two-tier structure that divides competences between the Member States and the EU itself, while Japan, as a single state, can take centralised decisions.

In other words, the differences between the two systems are not merely a matter of design choice; they reflect, to a considerable extent, deeper political and historical structures. The EU designs its internal market and its internal-security policy together, going so far as to establish a common counter-drone framework and an explicit civil-military synergy agenda. Japan has built up its system step by step through successive amendments to the Civil Aeronautics Act and complementary legislation, layering on individual elements such as airframe registration, national licensing, airframe certification, and the lifting of the Level 4 flight ban. Japan’s distributed system has the advantage of drawing on each domain’s specialist expertise, but it also has its drawbacks — the cumulative complexity of overlapping legislation for operators, and the difficulty of cross-cutting policy coordination.

Viewed side by side, the distinctive characteristics of each system come into sharper relief. The EU’s integrated framework can be understood as an institutional achievement built up against the constant

tension with national sovereignty; Japan's distributed system reflects the governance structure of a single state and the accumulated expertise of its individual ministries.

## Chapter 3: Drone Use by EU Maritime Authorities

Drones now play an important role in the work of EU bodies with maritime safety functions — the European Maritime Safety Agency (EMSA), the European Fisheries Control Agency (EFCA) and the European Border and Coast Guard Agency (Frontex). Drawing on publicly available information, this chapter examines the purposes for which each agency uses drones, and the types of drones they use.

### 3.1 EMSA

#### (1) About the Agency

EMSA provides technical and operational support to the European Commission and the Member States in implementing EU law on maritime safety, maritime security, and the prevention of and response to ship-source pollution. It is headquartered in Lisbon. EMSA does not have its own operational arm — that is, no uniformed body with enforcement powers — and instead supports Member State authorities in their maritime surveillance work [\[3-12\]](#). EMSA's use of drones centres on the protection of the marine environment, but also extends to elements of maritime safety and security.[\[3-12\]](#)

#### (2) How Drones Are Used

One of the principal uses of drones is emissions monitoring — the so-called “sniffer” role. Drones fly through ships' exhaust plumes to measure sulphur (SOx) and nitrogen (NOx) concentrations, verifying compliance with the EU Sulphur Directive [\[3-1\]](#) and ensuring compliance, in the relevant waters, with Sulphur Emission Control Areas (SECA) and Nitrogen Emission Control Areas (NECA). For reference, the current SECAs in Europe cover the Baltic Sea, the North Sea and the Mediterranean, with the Norwegian Sea added from 1 March 2026; the current NECAs cover the Baltic Sea, the North Sea and the Norwegian Sea [\[3-2\]](#).[\[3-1\]](#)[\[3-2\]](#)

Drones are also used to detect pollution. Equipped with specialised radar and infrared sensors, they can identify oil spills and chemical leaks, helping to identify the responsible vessel and gather evidence for any future legal action. They also support maritime safety by monitoring traffic in busy waters such as the English Channel, helping to prevent collisions and provide situational awareness in cases of fire or grounding. Finally, under its updated mandate [\[3-3\]](#), EMSA can also assist national authorities in tracking the so-called “shadow fleet” — vessels that switch off their transponders to evade international sanctions and safety regulations.[\[3-3\]](#)

#### (3) How the Drones Are Operated

EMSA operates medium-sized aircraft with long endurance (6–12 hours) and medium-to-long range — typified by fixed-wing platforms such as the TEKEVER AR5, which take off from a runway or by catapult [\[3-4\]](#). The Agency also uses medium-sized vertical take-off and landing (VTOL) aircraft, including Schiebel's Camcopter S-100 and the Airbus Flexrotor, with up to 10 hours' endurance, as

well as light VTOL aircraft, including quadcopters such as the Lockheed Martin/Nordic Unmanned INDAGO 2/Indago, which is deployed on pollution-response vessels [\[3-5\]](#). An overview of the current portfolio of remotely piloted aircraft systems (RPAS) is available on the EMSA website [\[3-6\]](#). The RPAS service is provided free of charge to the maritime authorities of EU Member States, candidate countries and EFTA countries. On request, the service is operated from the requesting country and can be deployed in any sea area around the EU [\[3-12\]](#). Operation and maintenance of the drones are carried out by private companies under contract with EMSA — including Schiebel and Airbus Helicopters — while the drones themselves operate under the command and supervision of the requesting country [\[3-13\]](#). The electro-optical and infrared imagery and radar data they collect are streamed in real time to the EMSA RPAS Data Centre, where they are made available live to the relevant Member State authorities [\[3-14\]](#).[\[3-4\]](#)[\[3-5\]](#)[\[3-6\]](#)[\[3-12\]](#)[\[3-13\]](#)[\[3-14\]](#)

## 3.2 Frontex

### (1) About the Agency

Frontex is the EU agency that supports Member States in managing the EU's external borders and coast guard functions, and helps respond to irregular migration and cross-border crime. It is headquartered in Warsaw. Of the three agencies discussed here, Frontex is the only one with its own uniformed operational arm: the Standing Corps. Standing Corps officers exercise border management enforcement powers and are authorised to carry service weapons, and the Corps is set to grow to 10,000 personnel by 2027 [\[3-15\]](#). Even so, primary responsibility for border management remains with the Member States: when deployed, Standing Corps officers operate under the command of the host country's authorities [\[3-16\]](#). Frontex's use of drones focuses on security at the EU's external borders and on the protection of life.[\[3-15\]](#)[\[3-16\]](#)

### (2) How Drones Are Used

Frontex's main use of drones is border surveillance — in particular, detecting unauthorised crossings and tracking the movements of human-trafficking and drug-smuggling networks. Drones are also used in search and rescue (SAR) operations, for example to locate overcrowded or drifting migrant vessels. High-altitude, long endurance drones are a central element of early-warning systems for detecting large-scale migratory movements.

### (3) How the Drones Are Operated

Frontex relies primarily on medium altitude, long endurance (MALE) RPAS for maritime border surveillance in the Mediterranean, migration monitoring and SAR support. In late 2024, for example, Frontex signed a renewed framework contract with Airbus DS Airborne Solutions (ADAS), part of Airbus, and its long-standing partner Israel Aerospace Industries (IAI), for four years' use of the Maritime Heron MALE system. These drones have an endurance of more than 20 hours, can operate day and night in all weather conditions, and stream data in real time to Frontex headquarters and to national authorities [\[3-7\]](#). Between late 2025 and early 2026, Frontex completed trials of next-generation tactical drones [\[3-8\]](#). As with EMSA, Frontex outsources flight operations to private contractors and does not employ its own pilots. The data collected feeds into the European Border

Surveillance System (EUROSUR), where it is shared with — and analysed by — Member States and Frontex headquarters [\[3-17\]](#). Standing Corps officers then use that surveillance information to carry out border management activities in cooperation with national authorities. [\[3-7\]\[3-8\]\[3-17\]](#)

### 3.3 EFCA

#### (1) About the Agency

EFCA is the EU agency responsible for coordinating and supporting Member States' fisheries-management and inspection activities, with a view to ensuring compliance with the Common Fisheries Policy. It is headquartered in Vigo, Spain. Like EMSA, EFCA has no operational arm of its own; instead, it coordinates and supports inspection work by Member State fisheries inspectors under Joint Deployment Plans (JDPs) [\[3-18\]](#). That said, EFCA staff can serve as "Union Inspectors" and carry out inspection duties in international waters; since 2024, they have also been empowered to inspect within Member States' exclusive economic zones (EEZs) [\[3-19\]](#). EFCA's use of drones focuses primarily on preventing illegal fishing.

#### (2) How Drones Are Used

By using drones, EFCA can monitor remote fishing grounds and identify vessels fishing without a licence or operating in protected areas where fishing is prohibited. Drones are also used to detect vessels engaged in the practice of discarding small, low-value fish at sea to preserve their quotas — something that is virtually impossible to confirm from a surface patrol vessel [\[3-9\]. \[3-9\]](#)

#### (3) How the Drones Are Operated

EFCA's operating model differs from that of EMSA and Frontex. Rather than maintaining its own drone fleet, EFCA makes extensive use of inter-agency cooperation. Under the Tripartite Working Arrangement on drone operations with EMSA and Frontex [\[3-10\]](#), EFCA draws on the drone services that EMSA and Frontex provide to support its fisheries-inspection work. EFCA's most recent work programme [\[3-11\]](#) also refers, in its chapter on "strategies for achieving efficiency", to "the use of drones and pollution-response equipment procured by EMSA". In practice, Member State fisheries inspectors gather at the EFCA Coordination Centre under JDPs and, drawing on surveillance data from drones and other sources, carry out inspections using Member State patrol vessels and aircraft [\[3-20\]](#).

## Chapter 4: The Portuguese Drone Market

### 4.1 The Current State of the Market

#### (1) Market Size and Growth

Portugal's drone market has expanded rapidly over the past few years. While the European market as a whole continues to be dominated by the United Kingdom, Germany, Italy and others [\[4-1\]](#), Portugal — led by TEKEVER — has built a growing presence in AI-driven and maritime surveillance UAS, and exports of military UAVs to Ukraine surged from €4 million in 2022 to €87.3 million in 2025 [\[4-2\]](#). The European drone market as a whole has been valued differently by different research firms, but on a

commercial-drone basis it is expected to expand to roughly USD 7.58 billion in 2025 and around USD 8.52 billion in 2026 [4-3]. Driving Portugal's export growth are companies emerging in the AI-driven UAS field — chief among them TEKEVER, with revenues of £75.29 million, approximately €87 million, in 2024, and USD 95 million, approximately €82 million, in 2025 [4-4]. Around them is a growing industrial ecosystem that includes Beyond Vision, UAVision and Connect Robotics, with more than 40 domestic manufacturers in total [4-5].[4-1][4-2][4-3][4-4][4-5]

## (2) The Civilian Sector

Outside the defence sphere, the Portuguese drone industry is seeing rapid growth in aerial photography and video services, particularly for the tourism and real estate sectors. This reflects the diversity and pace of development in the market.

## (3) Maritime and Defence Strategy

Portugal has the EU's third-largest exclusive economic zone (EEZ), at around 1.7 million km<sup>2</sup> [4-6]. The country is the host of NATO's annual REPMUS exercise — the world's largest maritime unmanned-systems experimentation event, held by the Portuguese Navy in Tróia and Sesimbra and bringing together more than 2,000 personnel from 30 countries in 2024 — which underscores Portugal's commitment to advancing naval technology [4-7]. Building on that momentum, the Portuguese Navy is developing what will be Europe's first dedicated "drone carrier", NRP D. João II (to be launched in April 2026 and expected to enter service in the first half of 2027, at a cost of €132 million) [4-8]. The vessel is designed as a multi-purpose platform for the deployment and operation of aerial, surface, and subsurface drones, offering a more flexible operating concept than that of a traditional aircraft carrier [4-9].

## 4.2 The Drone Manufacturer TEKEVER

### (1) Why TEKEVER Is Considered a Major Player

TEKEVER is regarded as a major player in the Portuguese market for four main reasons.

- **Valuation and funding. In terms of scale and capital strength, TEKEVER is now valued at more than £1 billion, or around €1.2 billion. It is the seventh Portuguese-founded company to become a "unicorn", meaning a privately held start-up valued at more than USD 1 billion, and the country's first defence-sector unicorn.**
- **Exports and public contracts.** TEKEVER has repeatedly signed large framework contracts with several European countries, including France and the United Kingdom. Its AR5 has been deployed on missions in Portugal, Spain, France, Italy, and the Baltic States, demonstrating the breadth of its export track record. The recent framework contract with EMSA alone is worth €30 million for an initial two years, with options to extend up to four. The contract provides several complete UAS for simultaneous deployment across European waters and is further evidence of a sustained, export-oriented business presence in the EU agency market.
- **Operations and footprint. TEKEVER is headquartered in Lisbon, employs more than 1,000 people worldwide, and has operations in France and the United Kingdom. It is rolling out a**

**five-year, £400 million, or around €460 million, UK strategic-investment programme called OVERMATCH, which is expected to create up to 1,000 highly skilled jobs in the UK.**

- **Technology.** On the technology side, TEKEVER has developed a number of drones, including the AR3 and AR5, with maximum endurance of around 20 hours. As of April 2025, its AR3 and AR5 systems had logged more than 10,000 combat flight hours in Ukraine.

## (2) Company Profile

Founded in Lisbon in 2001, TEKEVER began as an AI-focused software company. From 2010 onwards, it specialised in the development of surveillance drones, and it has since established itself as a notable European player in defence-related unmanned aerial vehicles (UAVs) and as a significant defence technology company.

Through its ATLAS platform, the company has positioned itself as a provider of “real-time intelligence as a service”. The platform processes data and delivers actionable insights to customers in both the civilian and defence sectors. Its AI-enhanced UAVs perform coastline surveillance, pollution tracking, infrastructure monitoring and fisheries control, and also support the detection of drug trafficking and irregular migration. The platform integrates onboard sensors, communications links and cloud analytics, reducing operators’ workload and accelerating decision-making.

TEKEVER operates across several European countries, with engineering centres in Portugal, the United Kingdom, and France, and production and operational support teams across Europe, including in Ukraine. Its AR3 surveillance drone has supported land and maritime operations in Ukraine since the outbreak of the war in 2022.

As noted above, TEKEVER recently became Europe’s newest unicorn. A funding round, timed to coincide with the launch of its five-year, £400 million UK programme to accelerate the company’s expansion and strengthen the European defence-innovation ecosystem, brought its valuation to €1.173 billion.

## (3) Flagship Products

### (i) TEKEVER AR3 EVO

The TEKEVER AR3 EVO is a next-generation, multi-role unmanned aerial system (UAS) designed for high-risk operations at sea, on land, and in conflict zones. Developed in Europe and combat-proven through extensive frontline use in Ukraine, the system is built around a modular concept. Its “four pillars of flexibility” allow operators to reconfigure the airframe’s payload, propulsion, communications, and deployment method quickly to meet specific mission needs. The aircraft can be assembled and airborne within five minutes, and can be switched between a pure fixed-wing mode (to deliver maximum endurance) and a VTOL mode (suited to operating from confined spaces of as little as 5 × 5 metres, such as a ship’s deck).

### (ii) TEKEVER AR5

The TEKEVER AR5 is a fixed-wing, medium altitude, medium endurance UAS optimised for wide-area maritime surveillance, search and rescue (SAR), and border security. It is recognised as a pioneering

platform, having been selected as the basis for Europe’s first UAS-based maritime surveillance system. In service since 2017, the AR5 has been deployed on missions in Portugal, Spain, France, Italy, and the Baltic States. EMSA and national authorities use its capabilities across a wide range of wide-area maritime surveillance tasks — maritime situational awareness, fisheries management, law enforcement, and environmental protection. The system also supports maritime rescue operations and can be fitted with a life-raft drop solution.

A technical comparison of the main characteristics of the AR3 EVO and the AR5 is provided in Annex 2.

### (iii) TEKEVER ARX

The TEKEVER ARX is a next-generation, high-performance UAS designed as a “mother drone” capable of deploying and coordinating swarms of smaller UAVs in complex, multi-domain operations. Originally scheduled for commercial debut in 2025, the ARX is TEKEVER’s largest and most advanced platform to date, with a maximum take-off weight (MTOW) of 600 kg, a payload of 150 kg, and an endurance of up to 30 hours. Designed for wide-area surveillance and life-saving missions, it is intended to bridge the gap between long-range sensor projection and high-resolution close-range inspection.

## (4) Major Customers

The main institutions deploying TEKEVER products include coast guards, border management agencies and EMSA.

- **Portuguese National Republican Guard (GNR):** TEKEVER won a competitive tender to supply the GNR. The contract introduces a state-of-the-art unmanned aerial system featuring a 3.5-metre catapult launch, a 100 km surveillance radius, and a 16-hour operating range. The AR3 strengthens Portugal’s coast guard capability through advanced drone-based surveillance and contributes to combating economic and environmental crime, including illegal fishing and drug trafficking. This public-private partnership delivers robust surveillance coverage along the entire Portuguese coastline, reinforcing both public safety and environmental protection.
- **European Maritime Safety Agency (EMSA):** TEKEVER signed a €30 million framework contract with EMSA to supply unmanned aerial systems for maritime operations. The initial two-year contract (extendable up to four years) covers two complete systems, each consisting of two UAS, enabling simultaneous deployment in multiple regions and strengthening surveillance across European waters. The core platform is the TEKEVER AR5 — a fixed-wing, medium altitude, long endurance UAS designed for complex maritime environments, with up to 12 hours of endurance and beyond-line-of-sight (BLOS) operation.
- **Spanish Ministry of the Interior (on behalf of the Spanish National Police Air Force):** TEKEVER signed a multi-purpose contract worth around €5 million with the Spanish Ministry of the Interior, on behalf of the Air Force of the Spanish National Police, with deliveries scheduled for 2024 and 2025. The contract covers several AR3 systems, accessories,

cameras, and access to TEKEVER's AI-powered ATLAS platform. The system was selected over competing offers on the basis of its performance in surveillance and maritime missions.

- **UK Home Office: The UK Home Office renewed its three-year contract with TEKEVER for the provision of “Surveillance-as-a-Service” using the company’s AR5 and AR3 drones, supporting maritime surveillance and other missions across the English Channel.**

### 4.3 Other Notable Drone Manufacturers

Although TEKEVER stands out as the leading player in this field, Portugal's UAS sector is supported by a diverse industrial ecosystem of innovative companies specialising in maritime security and border security.

#### (1) UAVision Aeronautics

UAVision Aeronautics, founded in 2005 in Ventosa (Alenquer), Portugal, specialises in the development and manufacture of unmanned systems for defence and environmental monitoring [4-10]. Its flagship product, the OGASSA OGS42, is a latest-generation military-grade UAS — 12 of which have been operated by the Portuguese Air Force's 991 Squadron since 2019 — while the VTOL variant (OGS42V, designated the Albatroz class by the Navy) is operated by the Portuguese Navy from Bartolomeu Dias-class frigates and Viana do Castelo-class offshore patrol vessels (OPVs) [4-11]. The company has long-standing partnerships with the Portuguese Air Force (PAF) and the Portuguese Navy, supplying a range of UAS — including the OGASSA UAS family and the Spyro platform — together with related sub-systems such as the UXpilot autopilot, the StormCOMM long-range communications system, and the UGS electro-optical sensor [4-12]. Its systems have been used in critical national missions, including ISR (intelligence, surveillance, and reconnaissance) operations for forest-fire monitoring and the detection and prevention of environmental threats, and they are now in service across four continents — in countries such as Brazil, Nigeria, Angola, South Korea, India, the United Arab Emirates, and Germany [4-13].

#### (2) Beyond Vision

Beyond Vision is a Lisbon-based drone manufacturer founded in 2013 by Dário Pedro and Luís Miguel Campos [4-14]. NATO-certified, the company's core technology comprises proprietary AI algorithms and a cloud-based UAV management platform called beXStream [4-15]. Its flagship products — the Class 3 hexacopter HEIFU (and the higher-end HEIFU Pro), the Class 3 quadcopter BVQ418, and the hybrid VTOL aircraft VTOne — are all designed for industrial and defence use [4-15]. Its main customers are concentrated in defence, security, and industrial-infrastructure markets, including the Portuguese Navy (which has operated six HEIFU and six VTOne aircraft since 2022), the Portuguese Army, French and German police forces, and Space42 in the Middle East [4-14][4-16]. About 95 per cent of production is exported, with the United States, the Middle East, Brazil, and Europe as the principal markets [4-14]. In 2025, Beyond Vision signed a €15 million contract to supply the United States with 300 emergency-response drones by 2028, with options to expand the order to as many as 1,000 [4-14][4-17]. As part of that agreement, the company plans to open a new manufacturing facility in the United States in 2027, at an investment of €50 million. Beyond Vision currently has around 80

employees and is targeting growth to 800 by 2035 [\[4-14\]](#).

### (3) Connect Robotics

Connect Robotics is a Portuguese autonomous-drone-delivery technology company based in São João da Madeira, on the outskirts of Porto, founded in January 2015 by Eduardo Mendes and Raphael Stanzani [\[4-18\]](#). The company’s aim is to reduce the time, cost, and environmental footprint of conventional ground-based last-mile logistics. Its core technology is a cloud-based platform that enables fully autonomous drone flight: a smartphone mounted on the airframe communicates with a cloud server via satellite-positioning systems (including Galileo) to set flight paths and monitor the drone in real time [\[4-19\]](#). By combining real-time kinematic positioning (RTK) with machine vision, the system supports high-precision delivery, including to confined locations in urban environments — windows, rooftops, and balconies [\[4-18\]](#). Connect Robotics follows a hardware-agnostic strategy: rather than building its own drones, it integrates its control system into multirotor aircraft (quadcopters and hexacopters) made by various manufacturers, including SleekLab [\[4-19\]](#). The company has obtained more than 15 BVLOS (beyond-visual-line-of-sight) flight authorisations, including under the new European regulations [\[4-18\]](#). Its main customers are concentrated in the medical, logistics, and postal sectors. Partnerships include Farmácia da Lajeosa, a rural pharmacy (delivering medicines to remote areas, a service for which it received an innovation award from the Portuguese National Pharmacy Association); CTT, the Portuguese postal service (the first BVLOS autonomous delivery service in the urban core of Lisbon); and Santa Casa da Misericórdia de Penela (meal delivery) — alongside hospitals, medical-testing laboratories, healthcare providers, and postal operators [\[4-18\]](#)[\[4-20\]](#). The company has been incubated by ESA Business Incubation Centre Portugal and was included in CB Insights’ 2024 “Pharma Supply Chain Tech Market Map” [\[4-20\]](#)[\[4-21\]](#).

### Annex 1 — Main Products by Manufacturer

Manufacturer	Main Products	Main Institutional Customers
<b>TEKEVER</b>	AR3 EVO: multi-role UAS (fixed-wing / VTOL) AR5: medium altitude, medium endurance fixed-wing UAS ARX: “mother drone” capable of deploying swarms	Portuguese National Republican Guard (GNR) European Maritime Safety Agency (EMSA) Spanish Ministry of the Interior (National Police Air Force) UK Home Office (coast guard and border management agencies)
<b>UAVision Aeronautics</b>	OGASSA OGS42: military-grade UAS	Portuguese Air Force Portuguese Navy Coast guards in several countries
<b>Beyond Vision</b>	HEIFU: Class 3 hexacopter	Portuguese Navy and Ministry of National Defence Maritime and port authorities Agriculture and infrastructure companies US customer (300-unit emergency-

Manufacturer	Main Products	Main Institutional Customers
		response drone contract)
Connect Robotics	Autonomous quadcopters and hexacopters	Hospitals, medical-testing laboratories, and healthcare providers Logistics and postal sector

## Annex 2 — Comparison of TEKEVER’s AR3 EVO and AR5

	AR3 EVO	AR5
<b>Primary missions</b>	Intelligence, surveillance and reconnaissance (ISR); electronic attack; communications relay; wide-area maritime surveillance	Search and rescue, border surveillance, maritime patrol, land surveillance
<b>Maximum take-off weight (MTOW)</b>	25 kg (up to 30 kg in VTOL mode)	180 kg
<b>Endurance</b>	Up to 22 hours (fixed-wing) / 14 hours (VTOL)	16–20 hours (depending on payload)
<b>Payload</b>	6 kg	50 kg
<b>Cruise speed</b>	46 knots (85 km/h)	100 km/h
<b>Communications range</b>	Less than 230 km	230 km (RLOS) / unlimited (SATCOM)
<b>Launch / recovery</b>	Catapult / VTOL / parachute	Automatic take-off and landing (ATOL) from unprepared runway (200–300 m)
<b>Dimensions</b>	4.2 m (wingspan) × 1.96 m (length)	7.3 × 4.0 m
<b>Propulsion</b>	Electric, internal combustion, or heavy fuel	Redundant twin engines (internal combustion)
<b>Radar systems</b>	IMSAR NSP-3 (SAR/ISR), CRFS, ESROE, Revector, Lifeseeker	IMSAR NSP-7 or NSP-5 (SAR / inverse SAR), MMTI/GMTI, and maritime radar
<b>Communications</b>	Starlink, Silvus, Persistent Systems (C and S band), Radionor, LTE, SATCOM, Link 16	SATCOM (Ka/Ku band), radio line-of-sight (RLOS), BRLOS, Link 16, and LTE

## Conclusion

This report has surveyed drone regulation in the EU, drone operations by EU bodies with coast guard functions, the comparison with the Japanese system, and trends among European companies — particularly those based in Portugal. Taken together, these elements confirm that drones are a cross-cutting technology that extends well beyond civilian use and industrial promotion, reaching into maritime surveillance, border management, public security, defence and counter-drone response.

In the EU, the institutional framework is being built around EASA. It addresses the operation, certification, pilots and airworthiness of UAS, placing drones within the body of civil aviation safety rules. At the same time — as European Drone Strategy 2.0 and the Action Plan on Counter-Drone Security make clear — the EU sees drones as a technology whose reach extends well beyond civil aviation, into industrial policy, internal security, the protection of critical infrastructure and border management, and even into defence. In this sense, drones are positioned as a cross-cutting technology that connects civilian, security and defence domains.

This regulatory and policy positioning is mirrored in the operational practice of the EU agencies. EMSA, Frontex and EFCA use drones for maritime surveillance, environmental monitoring, border management, search and rescue, and the monitoring of illegal fishing. These operations show that drones are not an immediate replacement for ships, manned aircraft, satellites or coastal radar; rather, they complement those existing tools, enhancing surveillance, enforcement and intelligence-collection capabilities.

The Japanese system has been examined as a comparative reference point for understanding the EU framework. There are differences between the two in terms of regulatory authority, legislative structure and administrative responsibility, but this report does not attempt to evaluate which system is superior. Rather, against the backdrop of each country's institutional history and administrative structure, it shows that drone regulation cuts across multiple administrative domains — aviation safety, public security, radio communications, defence, industry, and crisis management — and that the central challenge is how to coordinate these domains effectively.

The cross-cutting nature of drones is also evident in the industrial picture, particularly when one looks at companies in Portugal. As the example of TEKEVER and others shows, the drone industry is no longer simply about building airframes; it is a service offering that bundles AI, sensors, communications, data processing and operational support. From a corporate perspective too, drones emerge as a technology that spans maritime safety, border management, defence and public security, environmental monitoring and logistics.

Taken together, the regulatory framework, policy direction, agency operations, comparative analysis and industry trends covered in this report all point to the same conclusion: drones are a technology that cannot be captured in terms of any single use case or any single body of law. For that reason, the policy questions surrounding drones extend well beyond the performance of individual airframes or the application of individual statutes. They span civilian use, defence and public-security applications, industrial development, data use, privacy and counter-drone measures, and they require comprehensive institutional design.

In future research, we intend to continue using the European experience as one comparative reference point, while maintaining a broad perspective that encompasses research, development and manufacturing, procurement, data use, and other related issues associated with this cross-cutting technology.

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