

GENDARMERIE DRONES USED IN NATIONAL SECURITY MISSIONS

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ABSTRACT

This research advocates support for the continuous development and modernization of the police and gendarmic forces, analysing the use of Drones in the operational activities of the Portuguese and Spanish security, police and gendarmic forces: the GNR and the Guardia Civil. Analysing the implementation and expansion of Drones, valuing how the use of these means is advantageous for the police service and for the operations of the GNR and Guardia Civil. Due to the major changes taking place in the world, it is crucial to rethink security and Portugal is gradually adapting to this reality, resulting in new demands for daily police service. The adopted methodology is based on the inductive method that allowed the data collected through analysis to be generalized of data on Drones of the Guardia Civil, appreciating their characteristics and use, with the aim of understanding and comparing their modus operandi regarding the use of Drones in the GNR. In short, it was possible to verify the importance and potential of Drones in surveillance, reconnaissance and target tracking missions having been carried out productive and important conclusions for building Drones capacity in the GNR.

KEYWORDS

Unmanned Aircraft Systems; Unmanned Aerial Vehicle; Guarda Nacional Republicana; Guardia Civil

1. INTRODUCTION

The technological evolution made possible by the Digital Age is a growing phenomenon in society worldwide, in which digitization has become an active process of unstoppable change. Thus, it can be claimed that technological innovations have the capacity and power to renew an institution/organization, making it more modern, adaptable and competitive. There is a great expectation on the part of society towards the Gendarmerie (military force with law enforcement duties among the civilian population) due the responsibility for most of the national territory of a country, requiring the innovation of its procedures so that its institutional duties are assured as well as the fulfilment of its mission [1]. The transformation of criminal activity is partly driven by the changing landscape of social reality, leading to a situation where crime is progressively becoming more boundaryless. Within this context, the modern phenomenon known as a "crime spree" comes into existence, that means: a series of crimes committed in quick succession) characteristic of criminality, urban, mobile, violent and unpredictable, which obliges the security forces to adopt new measures and innovate by finding new responses aimed at the well-being and security of citizens [2, 3].

Drones offer various promising capabilities, serving as an addition rather than a substitute for any existing CCTV (Closed Circuit Television) systems or video surveillance measures employed by

the Gendarmerie Forces. Drones enable the efficient allocation of both human and material resources in operational tasks, significantly reducing the time needed to complete a specific mission while enhancing the operational capabilities of the Gendarmerie Force [4, 5].

Thus, the main purpose of this work is to analyze the use of unmanned aircraft, that is, Drones in Surveillance, Reconnaissance and Target Tracking missions in the police activity of the Gendarmerie Forces, and to discern to what extent the use of Drones and the expanding their employment constitutes an added value in the police service [6].

To this end, the Investigation Analysis Model was prepared and the General Objective (GO) was established: **To characterize the benefit of using Drones in surveillance, reconnaissance and target tracking missions in the police activity of the Gendarmerie Forces.** Subsequently were defined three Specific Objectives (SO), which are: (SO 1) Characterize Drones and their use in surveillance, reconnaissance and target tracking missions by Gendarmerie Forces; (SO 2) Identify the legal norms that regulate the use of Drones in Gendarmerie Forces; (SO 3) Characterize the process of acquiring Drones in Gendarmerie Forces.

This work has as its Starting Question (SQ): **What is the benefit of using Drones by the Gendarmerie Forces in surveillance, reconnaissance and target tracking missions?** This research work is structured into two distinct sections, each serving a specific purpose. The first part is devoted to the establishment of the theoretical foundation, encompassing several key components. The second part of the work focus on the practical aspects and the fieldwork conducted as part of the research.

In this paper, the main contribution are the following:

- 1) This study offers a unique and tailored examination of the deployment of drones within the Gendarmerie Forces. This particularized approach aims to provide a nuanced understanding of how these unmanned aerial systems are supplied to the forces, facilitating a comprehensive and empirical analysis of their present requisites, capacities, vulnerabilities, and untapped potential. By honing in on the specific context and requirements of the Gendarmerie Forces, this research endeavours to unearth valuable insights into the intricacies of drone utilization within this specialized law enforcement sector.
- 2) Shows the use of Drones in the pursuit of the missions of the Gendarmerie Forces, with the necessary adaptations at the level of Administration and State Policy, to accompany the extraordinarily fast evolution of the digital age that characterizes the world today that enhances efficiency and effectiveness of the strategic objectives of Gendarmerie Forces and States. In essence, this study highlights the symbiotic relationship between drones, administration, and state policy, emphasizing the pivotal role of drone technology in augmenting the effectiveness and efficiency of the Gendarmerie Forces and, by extension, contributing to the strategic goals and priorities of the state.
- 3) It exposes the legal, administrative, logistical and operational constraints that exist or may arise for the implementation of the capacity of Drones in the organization of the Gendarmerie Forces. It allows the identification of the specific and particular needs of different Units and/or Specialties of the Gendarmerie Forces, promoting the idea of creating different groups of Drones, according to the necessary characteristics (Type I, II and III), adjusted to the general and specific missions of the Units, General and Specific Missions of the Gendarmerie Forces.

This study provides a comprehensive exploration of the multifaceted challenges that arise within the Gendarmerie Forces when introducing the capacity of drones into their operational framework. It delves into various dimensions, encompassing the legal,

administrative, logistical, and operational aspects, which either pose existing constraints or have the potential to surface during the implementation process.

2. THEORETICAL BACKGROUND

The harmonization of the development of international civil aviation took place on December 7, 1944, with the Chicago Convention (Convention on International Civil Aviation), a treaty to the development of international civil aviation in a safe and orderly manner. Thus, Article 8 of this Convention states that an Aircraft capable of being operated without a pilot may only fly without a pilot over the territory of a State subject to a special authorization from that State and under the conditions stipulated in that authorization. Each State undertakes to take the necessary measures to ensure that the flight of aircraft without a pilot over regions open to civil aircraft is regulated in such a way as to avoid any danger to civil aircraft [7].

The civil aviation is regulated in three areas: at the international level, at the European, International and National levels where the States develop their local/national regulations [8].

At the international level, the International Civil Aviation Organization (ICAO) is responsible for developing norms, policies and good practices; for carrying out compliance audits; for carrying out studies and analyses; and for providing assistance/support in the development of aviation capability underpinning the cooperation of its member states and stakeholders [9].

At the European (EU) level, the European Organization for the Safety of Air Navigation (EUROCONTROL) is a pan-European civil-military organization that supports civil aviation in the vision of the EU, and at a technical level the air traffic management [10].

The European Aviation Safety Agency (EASA) is a decentralized European agency, responsible for regulating civil aviation activity ensuring the safety and protection of the environment in air transport in Europe [11].

In the Portuguese context, the National Civil Aviation Authority (ANAC) is an authority in matters of civil aviation with the nature of an independent administrative entity, endowed with administrative, financial and management autonomy, as well as own assets [12], responsible for regulating and supervising the civil aviation sector as well as the activities carried out in this field.

2.1. Airspace

The airspace can be divided into two fractions: controlled and uncontrolled (or special use) airspace. This division is made according to the complexity of the air traffic flow; the nature of the operations; the level of security; and for reasons of public/national interest [13, 14]. There are two types of flights in the airspace:

- VFR (Visual Flight Rules) flight – a flight operated according to visual flight rules, that is, when meteorological conditions allow the pilot to view the altitude, terrain and other air traffic [13-15].
- IFR (Instrument Flight Rules) flight – a flight in which the aircraft instruments are used to navigate, which can be used when weather conditions are favorable or not [13, 15].

2.2. Notice to Airman (NOTAM)

A NOTAM is a communication distributed through telecommunications that conveys vital information about the location, status, alteration, or potential risks related to any aeronautical facility, service, procedure, or condition. This information is crucial for individuals engaged in flight operations. In other words, it is a document that transmits information of an aeronautical system that is created occasionally, depending on the emergence of new no-go zones or changes to the boundaries of dangerous zones [16] [17].

2.3. Iberian Gendarmerie Forces

The National Republican Guard is institutionally positioned within the set of military forces and Security Forces and Services, being in Portugal the only security force with a military nature and organization, so it is appropriate to characterize it as a Military Security Force. The mission entrusted to the Guard is extensive and carried out throughout the National Territory in the different ways of acting: security, protection and national Defense, that is, by fulfilling missions and tasks: protection and rescue, military and international police [18, 19].

The Guardia Civil has competence in matters of security and in matters of a military nature, and must cooperate with civil and military authorities when they request its collaboration in criminal matters and the capture of criminals. The Guardia Civil is dependent on the Ministry of War with regard to its organization, personnel, discipline, material and collection of goods, and on the Ministry of the Interior with regard to its special service and its movement [18, 20-22].

2.4. Doctrine Regarding Civil Drone Operations

The rules and procedures for the operation of UAS (Drones), defines its operations (in the civil context) in three categories: “open” (low-risk operations, in which there is no need for a prior exploration license) – this category of operations is “divided into three subcategories (A1, A2 and A3) based on operational limitations, requirements applicable to the remote pilot, and requirements technicians for the UAS”; “specific” (medium operations risk); and the “certified” (high-risk operations, in which there is a need for certification of the environment UAS, operator and remote pilot licensing) [23].

2.4.1. Open Category Operations

In this classification, UAS (Unmanned Aircraft Systems) should have a Maximum Take-Off Mass (MTOM) below 25 kilograms and must be fitted with a European CE class conformity marking. In open category operations, UAS are not permitted to fly over concentrations of people, and they must take place at a maximum height of 120 meters above the ground surface, in airspace not controlled, or up to the maximum height permitted in operational protection zones, may still fly 15 meters above an artificial obstacle that is more than 105 meters in height, at the request of the entity responsible for the obstacle, as long as it does not move further than 50 meters from the obstacle [24].

2.4.2. Specific Category Operations

Whenever one or more requirements of Open Category operations (including subcategories (A1, A2 and A3)) is not met, the operations are always considered as operations of Specific Category. In case operators fail to adhere to these regulations, they can only conduct operations through one of the following options: a) Gaining operational authorization, which entails submitting a risk analysis and other required documents; b) Submitting a standard operating scenario declaration;

c) Obtaining a Light Unmanned Aircraft System (UAS) Operator Certificate (LUC), which is granted to legal entities, and it comes with certain privileges. To obtain operational authorization, operators must submit a “request and operational risk analysis, carried out using the SORA methodology. This risk analysis must be accompanied by mitigation measures, and converted into an operations manual, which must follow the means of compliance acceptable standards and the respective guidelines published by EASA [23] [24].

2.4.3. Certified Category Operations

Operation in the certified category directly depends on the characteristics of the Drones and the type of operations with it, and in this category the Drone must be always certified. Hence, operations falling into this category are determined by the attributes of the unmanned aircraft:

- a) Drone with dimensions "equal to or exceeding 3 meters, specifically designed for flying over crowds of people";
- b) Those Drones "designed for transporting hazardous materials, requiring a high level of durability to minimize risks to third parties in case of an accident";
- c) When the Drone is designated for use within the "specific operational category and receives authorization from ANAC after the operator's risk assessment, it may be deemed that the operational risks are effectively reduced, eliminating the need for Drone certification" [24].

2.5. Doctrine Regarding Military Drone Operations

Regarding Military Operations with Drones: these are State Aircraft and are also classified by classes depending on their weight, range and flight ceiling. Rotary-wing and/or fixed-wing military Drones must follow a minimum set of technical airworthiness requirements established by NATO so that they can be certificated. As a result, STANAG 4586 was developed to define the interfaces that need to be established to attain the necessary level of interoperability in alignment with the CONOPS operational concept. NATO classifies unmanned aircraft systems (Drones) into three distinct categories: Class I (under 150kg), which includes micro, mini, and small Drones ; Class II (between 150kg and 600kg), encompassing medium-sized tactical systems; and Class III (greater than 600kg), which comprises Medium-Altitude Long-Endurance (MALE) and Medium Altitude Long-Endurance (HALE) aircraft. These categories differ from one another in terms of their intended use, size, and operational altitude. Therefore, it can be deduced that the military Drones spectrum necessitates a variety of specific and distinct approaches depending on these classes [25].

2.6. Background of Police and Military Laws regarding Drones

2.6.1. Portuguese Gendarmerie Forces

The National Aeronautical Authority (AAN) has the authority to grant airworthiness certificates for military aircraft, oversee military-level air traffic management and navigation services, establish regulations for military aircraft's airspace operations, conduct inspections and supervision, and certify personnel involved in military aeronautical functions and national entities concerning the airworthiness of military aircraft [26].

With regard to the registration of military aircraft, nothing prevents them from being registered with the ANAC (National Civil Aviation Authority), however as dictated by the nature of the military function, it is common for military aircraft not to be included in that register, and there must be a separate register, military and not public [27].

For the purposes of air traffic management, the EUROCONTROL took a decision, according to which it determined that an aircraft that appear in the military register, or are identified as military in the civil register of aircraft (ANAC), are considered as being “aircraft used in military services” and “aircraft with civil registration, but used in military, customs and police services are classified as State Aircraft” [7, 27].

2.6.2. Spanish Gendarmerie Forces

Spain has specific regulations that regulate NON-EASA activities (through the AESA), deciding activities with Drones that are under the jurisdiction of the Member States [28].

At the military level, the use of Drones is regulated by the Operational Air Circulation Regulation approved by Royal Decree number 601/2016 applicable to all military aircraft (with or without crew), Spanish and abroad. These Drones have to fly in accordance with the rules issued by this Royal Decree that also classifies Spanish military aircraft according with the Maximum Take-Off Weight (MTOW). At the police level, the Guardia Civil has formulated an internal regulation: Technical Instruction 01/2020 of September on the acquisition and use of Drones, with everything related to anti-drone systems falling outside the scope of this Technical Instruction [29].

3. MATERIALS AND METHODS

3.1. Research Strategy and Approach Method

A qualitative research strategy was adopted due to the underlying premise that there exists an intimate and inseparable connection between the intricate realities of the world under examination and the subjective experiences and perspectives of the individuals who are the subjects of this study. This relationship is often too intricate, multifaceted, and context-dependent to be effectively quantified or expressed solely in numerical terms [30].

The focus in qualitative research is often on understanding the 'why' and 'how' of phenomena rather than quantifying the 'what' and 'how much.' The selection of a qualitative strategy in this research aligns with the recognition that certain research questions demand a nuanced exploration of complex, real-world phenomena and the intricate worldviews of the individuals involved. Qualitative research, through its sequential processes, serves as a valuable tool to achieve this depth of understanding: Collecting, interpreting, absorbing and experimenting with data; Data analysis; Conclusions are extracted; Hypotheses are formulated from the conclusions; The hypotheses can be used for the formulation of a theory.

The qualitative strategy is descriptive since it conceives descriptive data from documents, interviews and observation in which data collection is carried out using interviews, observation and document analysis [30, 31].

The inductive method advocates carrying out the greatest possible number of observations devoid of value judgments, personal considerations and/or preconceived ideas so that reality is encompassed in the most impartial way possible [30]. In the scope of this research, an inductive approach is being employed. This methodological choice involves a systematic and thorough analysis of data pertaining to the utilization of drones within the Spanish Gendarmerie.

The subsequent step in this research entails a comparative analysis of the *modus operandi*, or operational practices, concerning the deployment of drones in the Portuguese Gendarmerie. This

comparative analysis serves as a fundamental component of the research methodology, as it allows for the identification of patterns, commonalities, and distinctions in how drones are used within these two gendarmerie organizations.

3.2. Research Criteria and Method of Procedures

After reflecting on the multiple existing research criteria, it is verified that the great difference between them is indirectly centered on the different technical procedures and as this study dealt with a comparison between two cases (Portuguese Gendarmerie and Spanish Gendarmerie) contrasting through identical methods, the research criterion followed the comparative type [30]. In this investigation, the independent variable was the security forces of a military nature (Iberian Gendarmerie Forces) of two countries (Portugal and Spain).

These approach methods underpin the overarching research philosophy, such as whether the research is grounded in positivism, interpretivism, or another theoretical stance. They help shape the researcher's perspective on the world, the phenomena under investigation, and the research questions being explored. While procedure methods are concerned with the practical and technical aspects of data collection and analysis, approach methods provide the foundational principles and theoretical lenses through which the research is framed. Together, these two elements play a pivotal role in shaping the entire research process. In line with research criteria, this investigation follows the comparative method as it focuses on study of differences and similarities, explaining the identified divergences [32].

3.3. Analysis Model

To assist in delimiting the path of the research, it is essential to create a Starting Question that guides the researcher's study as a lighthouse and is aligned with the general objectives of the investigation. The Starting Question embodies the guiding principle of the investigation, bringing structure and coherence to the present work, so that the investigation is guided with clarity, feasibility and relevance [33, 34].

This investigation intended to answer the following starting question: “**What is the added value of using Drones by the Iberian Gendarmerie Forces in surveillance, reconnaissance and target tracking missions?**” in order to characterize the relevance of the applicability of Drones in the Portuguese Gendarmerie having as a comparative target, a similar force: the Spanish Gendarmerie. In this context, the Starting Question is aligned with the General Objective, which is “**to characterize the use of Drones in missions of surveillance, reconnaissance and tracking of targets in the police activity of the Iberian Gendarmerie Forces**”, and which advocates the synthesis of what is intends to achieve in this work, so the Specific Objective will explain the details and will be a deconstruction of the General Objective [32].

Consequently, the Derived Question (DQ) were defined, aligned with the Specific Objective so that the General Objective is substantiated and the Derived Question answered:

DQ1: Which units of the Iberian Gendarmerie Forces have Drones and that use them in their police activity, specifically in surveillance, reconnaissance and target tracking missions?

DQ2: How are characterized the Drones used by the Iberian Gendarmerie Forces?

DQ3: How is carried out the training of Drone operators in the Iberian Gendarmerie Forces?

DQ4: What are the legal norms that regulate the use of Drones by the Iberian Gendarmerie Forces?

DQ5: How does proceed the acquisition process of Drones in the Iberian Gendarmerie Forces?

3.4. Data collection methods and techniques

The process of data collection in this study encompasses a multi-faceted approach, involving the utilization of primary, secondary, and tertiary sources. These distinct categories of sources play varying but complementary roles in the research endeavour. Primary sources, the cornerstone of data collection, comprise original texts and materials that have not undergone interpretation or summarization by other authors. These sources provide a direct and unfiltered glimpse into the subject matter under investigation, offering raw and unmediated insights.

Secondary sources, in contrast, serve as valuable intermediaries that facilitate access to primary sources. By condensing, summarizing, and providing context to primary source content, secondary sources assist researchers in extracting deeper meaning and comprehending the significance of the primary data.

Tertiary sources encompass all those references and materials from both primary and secondary sources. They act as comprehensive repositories of knowledge, offering researchers a structured and categorized overview of the existing literature and research findings within a specific field.

This multi-tiered approach to data collection, integrating primary, secondary, and tertiary sources, ensures a robust and well-rounded foundation for the research. By drawing upon these varied sources, the study benefits from a diverse array of perspectives and insights, enhancing the depth and breadth of the investigation. [34, 35].

Thus, the primary sources involved internal documentation of the Iberian Gendarmerie Forces (NEP, Technical Instructions, Orders and Directives); secondary sources comprised magazines, books, master's dissertations, doctoral theses, scientific articles in physical and online format; tertiary sources, on the other hand, involved university repositories, glossaries and encyclopaedias.

The interview process was thoughtfully organized and structured to incorporate a combination of open-ended and closed-ended questions, meticulously following a predefined Interview Guide. It allowed the interviewee a degree of autonomy and flexibility in responding to the questions, contributing to a more dynamic and conversational atmosphere.

The use of open-ended questions encouraged the interviewee to express their thoughts and perspectives in a free-form manner, fostering rich, nuanced responses. Simultaneously, the interview included closed-ended questions, which, by their nature, limit the range of possible responses to a dichotomous format, often requiring straightforward "yes" or "no" answers.

The interviewees were contacted via institutional email, which included the Research Analysis Model, the Presentation Letter, the Interview Guide and the Declaration of Informed Consent (signed by all interviewees) so that the interviewees had awareness of the research topic and the questions that would be answered, being aware that they could refuse to respond to the interview and that the data collected were subject to confidential treatment [32, 36].

3.5. Sampling Procedures, Data Treatment Techniques and Data Analysis

The sample is part of the population / universe, being chosen according to a rule, since the population / research universe presupposes the totality of individuals with the same particularities within the scope of a study. The target population has a direct influence on the conceptualization of research results. Therefore, in this research there was a concern with the size and quality of the

sample, represented as a subset of individuals from the target population. Sampling was classified as non-probabilistic because the interviewees were chosen intentionally.

It is also an intentional sample, of rational selection because the investigation was purposely directed at groups of elements whose opinion was desired through interview surveys. Since the nature of the investigation (universe) was directed to the Iberian Gendarmerie Forces with the uniqueness of Drones, this particularity consequently amplified the sample covering entities such as ANAC, AAN, PSP and entities with functions related to Police Law and privacy and protection of personal data treatment [32, 34, 36].

The sample of this investigation is a total of 27 interviewees divided into 4 groups:

- **Group A:** 14 interviewees from Portuguese Gendarmerie.
- **Group B:** 8 interviewees from the Spanish Gendarmerie.
- **Group C:** 2 interviews aimed at specialists in Police Law and privacy and protection of personal data.
- **Group D:** 3 interviews directed at specialists in the field of Drones (AAN, ANAC, PSP).

In the course of the interviews, a notable and important phenomenon emerged, namely, the saturation point in certain questions. This saturation point became evident when the interviewees' responses and contributions began to exhibit a recurring and consistent pattern.

The treatment of the surveys by interview was done using the technique of content analysis in which an exhaustive analysis was made of all the answers given by each interviewee, with content analysis tables having been formulated with summaries and key ideas that materialize a descriptive material that is read and synthesized identifies the themes and problems [37].

The carrying out of exploratory interviews and interview surveys enabled the creation of SWOT matrices regarding the use of Drones in surveillance, reconnaissance and target tracking missions by the Iberian Gendarmerie Forces. The interviewees were recorded and later transcribed. In eight cases they were translated, having been submitted for revalidation to each interviewee.

4. RESULTS AND DISCUSSION

4.1. Drone Legislation in the Iberian Gendarmerie Forces

Of the 24 interviewees, all showed knowledge of the civil and/or military legal framework for Drones, with the exception of interviewee E9. Regarding the legal norms that regulate the use of Drones by the Portuguese police forces, Group A and D were generally unanimous in referring to European and national civil regulations (from interviewees E1, E2, E8, E10.1, E10.2 and E25). Reference was also made at the military level to Regulation no. 533/2020 of June 18, which defines the conditions for issuing military remote pilot licenses for unmanned aircraft only applied to the Armed Forces (interviewee E25).

Interviewees from Groups A and D (National Republican Guard) noted that there are still no legal regulations regulating the operation of Drones at the service of the Security Forces and Services (interviewees E1, E25). ANAC (interviewee E23) declares that the Portuguese State adopted Decree-Law number 87/2021 in order to guarantee compliance with European regulations, so in the particular case of the National Republican Guard, it must comply with the regulations and determinations of the AAN. The AAN (interviewee E24) states that Regulation (European Union)

2018/1139 of the European Parliament and of the Council, of July 4, 2018, EASA, does not apply to the military, as written in number 2 of Article 3rd.

The interviewees in Group B were unanimous as in Spain the legislation that regulates police drones is clear, objective and stratified. According to the Spanish law that legitimizes the use of drones, there are three documents that correspond to European regulations, regulations national (civil and military) and internal regulations (Guardia Civil). European regulations are the same as applied in Portugal (European community). National regulations, Royal Decree No. 1036/2017, an application document in Spain that regulates activities with drones for civil users and non-EASA flights.

4.2. Civilian *versus* Military Doctrine about Drones in Iberian Gendarmerie Forces

In the National Republican Guard, 10 interviewees (E1, E3, E4, E6, E7, E8, E9, E10, E10.1 and E11) refer that there is no doctrine in this institution about Drones, but 3 interviewees (E2, E5 and E10.2) refer to the existence of a doctrine on these in the National Republican Guard, identifying Procedure number 01 (Integrated National Center for Operational Management / Operational Command) which, on page 6, states that Drones have a differentiated activation; and the doctrine developed in the Emergency Protection and Help Unit. According to interviewee E11, in National Republican Guard there is still no internal and doctrinal regulation, approved by superiors, that standardizes the use of this medium, uniformly throughout the device.

It was analysed whether the categories of civil operations with Drones (open, specific and certified) were adapted to the needs and characteristics of operations using Drones by police forces. It was verified that 6 interviewees (E1, E7, E10, E10.1, E10.2 and E18) considered these 3 categories are suitable for the range of police missions, and the need for certification of the military to fly in all categories (interviewee E1). Of the 24 interviewees, none responded that the open category is exclusively or uniquely suited to the needs of police missions. However, 5 interviewees (E5, E8, E13, E14 and E23) concluded that the open and specific category, gather the characteristics necessary to satisfy the assumptions of police missions.

In accordance with the provisions of Regulation (European Union) No. 947/2019, civil operations in the three categories do not suit the needs and characteristics of police missions, as they are too restrictive, and this reality is transversal to various forces similar police officers in the European Union (interviewee E25) as verified in the Guardia Civil with the production of its own legislation and operations manuals aimed at police missions with Drones.

4.3. Drones in the Iberian Gendarmerie Forces: a Way or a Capability?

Ten of the interviewees (E1, E2, E3, E4, E5, E6, E9, E10, E15, E16 and E19) stated that it is a means, on the other hand, 4 interviewees (E8, E10.1, E14 and E20) maintain that Drones are a capability and 5 interviewees (E7, E10.2, E11, E13 and E18) state that if Drones are cumulatively a means and a capacity in police operations, on the other hand, 2 interviewees did not express an opinion on this issue (interviewees E2 and E17)

Interviewees who consider Drones a capability do not have the same conception of the concepts of means and capacity. For interviewee E8 it is a capacity since it characterizes Drones equipment as a “means” (inherent to the definition lexicon of what serves to achieve an end), interviewee E10.1 considers it a capability because it is a new valence in the National Republican Guard, so the operator has the possibility to decide which Drones to use for each mission, according to the characteristics of the operation.

On the other hand, interviewee E7 from Group A and interviewees E13 and E18 from Group B argue that it is a means when we refer to the device per se, inherent in the lexical definition of “what serves to achieve an end”, identifying the capacity when referring to the set of means (interviewee E7) or the possibility of gathering information to support the Command's decision-making (interviewees E13 and E18).

4.4. Drones in the Iberian Gendarmerie Forces: Current Status

The National Republican Guard has three dozen Drones while the Guardia Civil has 3 hundred Drones. Of the 20 Territorial Command of the National Republican Guard, only 8 have Drones and they are used in Criminal Investigation, Road Safety, Nature and Environment Protection, Protection and Rescue, and other missions. In the National Republican Guard, although the K9 Intervention Unit of the Intervention Unit and the Coastal Control Unit have Drones, they still do not carry out real missions as the Drones are still in the implementation and adaptation phase. As for the prevalence of Drone brands used by the Iberian Gendarmerie Forces, it was found that DJI is the predominant brand. Surveillance, reconnaissance and target tracking missions are part of several specific missions of the National Republican Guard's police activity. Of the 18 people interviewed (10 people from the National Republican Guard and 8 people from the Guardia Civil), currently 17 people use drones in their police activity (see table 1).

Table 1. Iberian Gendarmerie units that use Drones in their police activity.

	Group A										Group B									
interviewee	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10 E10.1 E10.2	E11	E13	E14	E15	E16	E17	E18	E19	E20	
use Drones?	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y	Y	

It was found that 11 people (6 people from the National Republican Guard and 5 people from the Guardia Civil) use Drones in surveillance, reconnaissance and target tracking missions (see table 2), these were classified in the various attributions / missions of the National Republican Guard. It should be noted that not all the people interviewed cumulatively include surveillance, reconnaissance and target tracking missions in their police activity, so the Special Operations Intervention Unit of the National Republican Guard (interview E5) excludes surveillance; the Traffic Grouping of the Guardia Civil (interview E14) excludes target tracking; the Directorate of Criminal Investigation of the National Republican Guard (interview E6) and the Special Intervention Unit of the Guardia Civil (interview E17) only include recognition.

Table 2. Units of the Iberian Gendarmerie Forces carrying out surveillance, reconnaissance and target tracking missions.

	Group A										Group B									
interviewee	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10 E10.1 E10.2	E11	E13	E14	E15	E16	E17	E18	E19	E20	
surveillance	Y	Y		Y	Y			Y		Y		Y	Y		Y		Y	Y	Y	
reconnaissance	Y	Y		Y	Y	Y		Y	Y	Y		Y	Y		Y	Y	Y	Y	Y	
target tracking	Y	Y		Y	Y			Y		Y		Y			Y		Y	Y	Y	
others			Y			Y	Y			Y	Y	Y	Y	Y						

The missions assigned to each unit and with potential use of Drones are presented in table 3.

Table 3. General Missions & Surveillance, Reconnaissance and Target Tracking with potential use of Drones. Caption: V=Surveillance, R=Recognition, SA=Target Tracking, LSA=Target Locating and Tracking, OM=Other Missions.

		General Missions								
interviewee		Security	Criminal investigation	Road safety	Coastal and border control	Protection of nature and environment	protection and rescue	tax and customs	general police	police specials
Group A	E1	V+OM							V	R+LSA
	E2		V+R			V+R				
	E3		OM	OM						
	E4						R+LSA			
	E5	V	R						V	R+LSA
	E6		V+R+SA							R
	E7				V+R+LSA					
	E8							V+R+SA		
	E9									R
	E10, E10.1, E10.2						V+R+LSA			
E11	V		V	V	V	OM		OM	R	
Group B	E13	V							V	
	E14		OM	OM						
	E15	V+OM			V					
	E16		V+R+SA							
	E17								V+R	LSA
	E18								V	R+LSA
	E19		V+R+SA							
	E20	V+R+SA								

It was possible to verify the predominance of the use of Drones in missions involving surveillance and reconnaissance (Table 3), but there are interviewees that use Drones for other types of missions.

4.5. Common Features of Drones

Regarding the main characteristics that Drones should have, 14 interviewees highlighted autonomy (E1, E2, E3, E4, E5, E8, E9, E10, E10.2, E11, E13, E18, E19 and E20); 8 interviewees highlighted the thermal camera (E1, E2, E4, E7, E10.2, E11, E17 and E20), 8 interviewees highlighted the optical zoom (E1, E5, E7, E10.2, E14, E16, E18 and E20); 6 interviewees highlighted the minimum noise (E6, E16, E17, E18, E19 and E20) and 6 interviewees highlighted the image resolution (E9, E10.1, E11, E14, E15 and E17).

Autonomy was disregarded by some interviewees (E6, E10.1, E14, E15, E16 and E17), given that the missions performed with Drones do not qualify as long-lasting, with the autonomy of 20 minutes of flight being considered sufficient (interviewees E6, E14 and E17). Image resolution, on the other hand, is of importance for the interviewees who carry out missions where the detail can make the difference in decision-making, as is the case of the National Republican Guard's

Center for Inactivation of Explosives and Underground Security (interviewee E9), where it is essential to have a very detailed image of the suspected object or the Traffic Unit of the Guardia Civil (interviewee E14) for the inspection of indirect proceedings or crimes in road inspection missions using drones.

4.6. Legitimacy in the use of video cameras in Drones by the Security Forces

It is consensual for all interviewees that the use of video cameras in Drones should be allowed and provides positive benefits for the police and citizens. The most outstanding advantages were: specific operational support in crime prevention and repression operations (interviewees E1, E2, E21), image recording that facilitates the collection of evidence in missions of a criminal investigation nature (interviewees E4, E5, E7 and E8), increasing the efficiency of decision-making (interviewees E7, E10.2, E20, E25), capture/recording of illegal acts (interviewees E4, E6, E13 and E22) and also the prevention of crimes and other contrary events to the Law (interviewee E22).

The main difference mentioned by the interviewees, despite all agreeing, is based exclusively on authorization, that is, in Portugal (Group A, C and D) prior authorization by the Criminal Investigation Judge is required, whereas in Spain (Group B), it is carried out the capture of the image and subsequently, if there is no unlawful act, they are deleted, otherwise they are kept and sent to the judicial authority.

4.7. Potentialities and Limitations of the Use of Drones by the Iberian Gendarmerie Forces

The potentialities listed by the interviewees, the general opinion stands out that Drones are an excellent tool to support Command and Control, 13 of the interviewees consider that Drones allow the commander of the operation to make decisions in a more thoughtful and assertive way (interviewees E1, E2, E3, E6, E7, E8, E9, E10.2, E11, E15, E17, E18 and E20). The remaining advantages listed focus on risk reduction (interviewees E2, E5, E9, E10, E13 and E17), resource efficiency (interviewees E2, E4, E10.1, E11, E13 and E20), safety (respondents E5, E9, E10 and E19) and the ability to see without being seen (interviewees E7, E10, E13 and E16). It is thus possible to define three general areas: (i) Command and Control – support to Command and Control; (ii) Security - advantages of risk reduction, security and seeing without being seen; (iii) Human resource management - resource efficiency.

Regarding the technical specifications, the interviewees are unanimous in presenting the climatic conditions and autonomy as more complex difficulties at a technical level.

4.8. Insurance, Training and Acquisition of Drones

Analyzing the need for insurance for Drones, it was found that of the 26 interviewees, 16 agree with the existence of insurance (Portugal: E1, E2, E5, E7, E10., E10.2, E21, E22 and E23) (Spain: E13, E14, E15, E16, E18, E19, E20), 7 interviewees argue that insurance should not exist (interviewees E3, E4, E6, E8, E11, E24 and E25) and 3 interviewees (E9, E10 and E17) have no opinion on the matter. However, after exploring the interviews, it appears that 3 of the interviewees who consider insurance necessary, E1, E2 and E5, defend the existence of insurance under the legislation that regulates State vehicles, that is, the State must constitute itself as an insurance company for their movable assets, like the 7 interviewees who argue that there should be no insurance because the State should grant Drones the provisions of the extra-contractual civil liability regime of the State and other public entities for damages resulting from the exercise

of political-political functions. legislative, jurisdictional and administrative (Decree-Law No. 67/2007 of 31 December).

In this way, it is possible to state that 13 of the interviewees (E7, E10.1, E10.2, E13, E14, E15, E16, E18, E19, E20, E21, E22 and E23) consider that there must be civil protection insurance, while 10 of those interviewed (E1, E2, E3, E4, E5, E6, E8, E11, E24 and E25) consider that Drones should be included in Decree-Law number 67/2007 of December 31st. It should be noted that within Group A, C and D (interviewees from Portugal) there are 6 interviewees defending the use of civilian insurance, 3 military interviewees (E7, E10.1 and E10.2) and 3 civilian interviewees (E21, E22 and E23), on the other hand, there are 10 interviewees, 9 Criminal Police Agency (E1, E2, E3, E4, E5, E6, E8, E11 and E25) and 1 civilian (E24) who defend the lack of civil insurance, the legislative provisions of Decree-Law no. 67/2007 of 31 December must be checked. In Group B, none of the interviewees agreed with the lack of civil insurance, due to the internal reality of their country (Spain), where the State does not assume itself as an insurance entity and establishes civil insurance for State vehicles and other public entities.

Regarding training in Group A, there are 2 units with Drones, but without any training (interviewees E1 and E4), the remaining units that have Drones have internal training (Unmanned Aircraft Remote Pilot Course and Remotely Piloted Aircraft System Course) and external training (Guardia Civil and open category A1, A2 and A3). In Group B, all entities have Drones and the operators have certification both internally (Tactical Training Air Service of the Guardia Civil) and externally (State Air Safety Agency - AESA, open category A1, A2 and A3 and STS (Declarative Operation Scenarios)).

In Group A and D there are 5 units that do not have their drone operators registered. The rest are registered with ANAC (interviewees E7, E8 and E11) and ANN (interviewees E10, E10.1 and E10.2). In Group B, all operators are registered with various entities, AESA (interviewees E13, E15, E16, E18, E19 and E20), Air Service of the Guardia Civil (interviewees E13, E15, E18, E19 and E20), Guardia Civil Traffic Grouping (interviewee E14) and Ministry of Defense (interviewee E16). ANAC considers that State Drones should be registered on the ANN platform as civilians Drones, while ANN considers that the National Republican Guard Drones should be registered on a military platform.

The acquisition process at the Republican National Guard takes place through the foreseen logistical channels, through direct adjustment. when the value does not exceed the limits defined by the legislation. The process of acquiring Drones in the Guardia Civil, the Air Service of the Guardia Civil receives a document with the needs of the type of flight to be carried out and/or characteristics that the Drones must have, as well as the maximum budget (interviewee E13). The Guardia Civil Air Service looks for the product that best adapts to the transmitted needs and according to the budget.

5. CONCLUSIONS

The primary objective of this study is to conduct an in-depth examination of the utilization of drones in the law enforcement activities of the Iberian Gendarmerie Forces. Specifically, the focus was on assessing their role in tasks related to surveillance, reconnaissance, and target tracking missions. Through a meticulous exploration of drone applications within the Gendarmerie Forces, the study sought to unearth valuable insights, patterns, and operational strategies that could inform and address the central research questions.

Regarding **DQ1: “Which units of the Iberian Gendarmerie Forces have Drones and that use them in their police activity, specifically in surveillance, reconnaissance and target tracking**

missions?” it was verified that the National Republican Guard has a total of 34 Drones and the GC 329 Drones. The National Republican Guard Drones are located in several Territorial Commands, also in the General Command (Communication and Public Relations Division and the Criminal Investigation Department), Tax Action Unit, Protection and Rescue Emergency Unit, Intervention Unit, and in the Coastal Control; while the Guardia Civil has Drones in all Guardia Civil Commands and Specialized Units, covering its entire area of operation.

Currently, of the 19 people interviewed, 17 make use of Drones in their police activity, except for: the Coastal Control Unit (interviewee E7) which has Drones, but does not yet use them in real missions and the Operational Command (interviewee E11) whose answer encompasses all National Republican Guard. Of the 17 Units that use Drones in police activity, 15 use Drones in surveillance, reconnaissance and target tracking missions, the Iberian Gendarmerie Forces Units specialized in road enforcement (interviews E3 and E14) do not carry out this type of missions using Drones, however in the field of road safety they resort to the use of Drones to support the command decision (interviews E3 and E14), manage traffic and carry out road inspections (direct and indirect records) (interviewee E14).

As for **DQ2: “How are characterized the Drones used by the Iberian Gendarmerie Forces?”** it became apparent that there existed a divergence in the opinions of the interviewees regarding the characterization of drones as either a means, a capacity, or perhaps both. However, what stood out prominently was the clear intention of the National Republican Guard, as evidenced through the "Implementation Capacities with Drones" working group, to view drones primarily as a capacity.

An interesting aspect that emerged during the study pertains to the role of the Portuguese State concerning drones in the context of the Armed Forces. It was evident that the Portuguese State assumes a clear responsibility as the insurer of the drones utilized by the Armed Forces. However, a level of uncertainty loomed when considering the drones employed by the Security Forces. Unlike the Armed Forces, where the responsibility for ensuring the drones is distinctly assigned, the security landscape appeared to be marked by a certain degree of ambiguity in this regard. In contrast, the approach taken by the Spanish State regarding the Guardia Civil's drones is notable. Unlike its Portuguese counterpart, the Spanish State does not inherently assume the role of an insurance entity for the Guardia Civil's drones. Instead, the Spanish State proactively establishes civil insurance arrangements to cover these aerial assets.

Regarding **DQ3: “How is carried out the training of Drone operators in the Iberian Gendarmerie Forces?”**; it was found that the training / certification of the operators of the National Republican Guard: the certification that only a few operators have is internally the Remote Pilot Course for Unmanned Aircraft and Remotely Piloted Aircraft System Course (not recognized), and externally the course given by the Air Service of the Guardia Civil and open category A1, A2 and A3, with the cost to be supported by the operators. At Guardia Civil, operators are certified internally (Guardia Civil Air Service tactical training) and externally (AESA, open category A1, A2 and A3 and STS), with costs borne by the Guardia Civil.

In light of these considerations, it's evident that the GNR has recognized the need for proactive measures and solutions. As a response to the evolving landscape of Drones and the growing importance of drone operations, the GNR is actively engaged in the certification and recognition process for its remote pilots.

Regarding **DQ4: “What are the legal norms that regulate the use of Drones by the Iberian Gendarmerie Forces?”**; The investigation revealed an intriguing aspect in the realm of drone regulation. Specifically, it was observed that the European regulations pertaining to drones

remain consistent across various countries within the region. However, a significant point of differentiation was identified in the legislation developed by individual nations. In the case of Portugal, the legislative landscape for drones comprises distinct sets of norms, one addressing civilian applications and another designed exclusively for military use by the Armed Forces.

In contrast, Spain presented a unique legal context. While European regulations set the broader stage, Spain has yet to establish specific legal norms that comprehensively regulate the operation of drones in the service of the Security Forces.

With regard to **DQ5: “How does proceed the acquisition process of Drones in the Iberian Gendarmerie Forces?”** it was uncovered that within the Republican National Guard, the acquisition process is conducted through established logistical channels, but intriguingly, this process unfolds autonomously. In practical terms, this implies that each individual Unit within the Republican National Guard is responsible for crafting its own unique acquisition process. As for the process of acquiring Drones at the Guardia Civil, the Guardia Civil Air Service manages the acquisition based on the technical and financial guidelines provided.

This work allowed for a comparative analysis of the use of Drones by the Iberian Gendarmerie Forces in the course of their police activity and specifically in surveillance, reconnaissance and target tracking missions, extracting their advantages and disadvantages, answering the starting question **“What is the added value of using Drones by the Iberian Gendarmerie Forces in surveillance, reconnaissance and target tracking missions?”**. It was possible to verify that the use of Drones by the National Republican Guard in missions of surveillance, reconnaissance and tracking of targets has as main advantages the support to the command and control (command decision in making adequate and correct decisions). As for the use of Drones by the Guardia Civil in the respective missions, the main advantages were support for decision-making; increased resource efficiency and decreased exposure of the military to materializing in the reduction of risk and advantage in seeing without being seen.

As disadvantages, on the part of the National Republican Guard, the difficulty in acquiring resources with regard to monetary issues and ad hoc acquisition; the lack of training for Drone pilots suitable for the tactical-police scope and the existing training of pilots at the internal level of the National Republican Guard not being recognized by external entities. On the part of the Guardia Civil, the main disadvantage was the fact that the Drone inhibition systems only covered DJI Drones. It was concluded that, despite two similar forces, but different in terms of the legal framework and in using Drone resources, both have in line the strategic vision of taking advantage and income from Drones in operational and police scope.

In conclusion, the comprehensive analysis of the Republican National Guard (GNR) and the Guardia Civil has shed light on some intriguing dynamics.

Despite the GNR and Guardia Civil sharing many similarities as law enforcement and security forces, it has become apparent that they operate within distinct legal frameworks concerning unmanned aircraft. This strategic alignment underscores their collective pursuit of a central mission: safeguarding democratic legality, upholding internal security, and ensuring the rights and well-being of their respective citizenry.

Appendix A - Sociometric characterization of the interviewees

Table 4. Sociometric Characterization of Group A interviewees.

	Name (initials)	Rank	Function	Headquarters
E1	P.M.S.N.	Lieutenant Colonel	Commander	Public Order Intervention Unit of the Intervention Unit
E2	P.A.M.R.	Captain	Head of the Planning and Control Organization Division	Directorate of the Nature and Wildlife Protection Service
E3	C.L.L.P.	Captain	Deputy Head of the Operations, Information and Public Relations Section	National Transit Unit
E4	A.S.G.S.	Captain	2nd Commander	K9 Intervention Unit of the Intervention Unit
	T.M.S.S.	Captain	Commander of the K9 Detection Company	
	A.M.R.	Lieutenant	Deputy Commander of the K9 Detection Company	
E5	M.A.G.	Major	2nd Commander	Special Operations Intervention Unit of the Intervention Unit
E6	P.M.A.R.	Major	Head of the Doctrine and Training Center	Directorate of Criminal Investigation
E7	S.J.F.S.	Captain	Deputy Command and Operational Control Center / Deputy Head of the National Coordination Center for Frontex (Eurosur)	Coastal Control Unit
E8	G.E.R.O.	Captain	Research Detachment Commander	Tax Action Unit
E9	M.R.A.P.	Chief Sergeant	Deputy Commander	Underground Explosives Deactivation and Security Center
E10	J.R.G.R.	Colonel	Commander	Protection an Rescue Emergency Unit
E10.1	P.A.P.P.	Major	Head of the Emergency Technical Support Cell	
E10.2	E.F.F.	Main Guard	Assistant of the Emergency Technical Support Cell	
E11	C.A.R.Q.	Major	Head of Operations Division	Operational Command
E12	M.A.G.C.	Chief Sergeant	-	Public Order Intervention Unit of the Intervention Unit

Table 5. Sociometric Characterization of Group B interviewees.

	Name (initials)	Rank	Function	Headquarters
E13	J.S.L.C.	Major	Commander	Guardia Civil Air Service
E14	L.F.M.	Major	Head of Surveillance Business	Guardia Civil Traffic Grouping
E15	A.A.R.	Lieutenant	-	Guardia Civil's PEGASO team
E16	Guardia Civil Operational Support Unit			
E17	Special Intervention Unit			
E18	J.F.	Sergeant	Head of Drone/Anti-Drone ability	Guardia Civil Rapid Action Unit
E19	Central Operative Unit of the Guardia Civil			
E20	A.B.T.	Sergeant	Crowd control	Guardia Civil Reserve and Security Unit

Table 6. Sociometric Characterization of Group C interviewees.

	Name (initials)	Rank	Function	Headquarters
E21	M.M.G.V.	Doctor of Law	University Professor	Autonomous University of Lisbon
E22	C.I.F.J.	Lawyer since 2000	Director of Security (Private)	Autonomous University of Lisbon

Table 7. Sociometric Characterization of Group D interviewees.

	Name (initials)	Rank	Function	Headquarters
E23	F.C.	head of department	Head of the Unmanned Aircraft Department	National Civil Aviation Authority
E24	C.P.	colonel	Deputy Cabinet Chief	National Aeronautical Authority
E25	P.M.F.C.	chief	Head of the Unmanned Aerial Means Section of the Special Police Unit	public security police

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Ethical Approval: This study was approved under Information N° 471/14/GAB/CDF, Process N° 080.30.04, date 04/12/2014, signed by chief of doctrine command and formation of the Republican National Guard, MGen Rui Moura.

Informed Consent: Informed consent was obtained from all individual participants included in the study. The consent forms used in this study explicitly stated that the data collected would be used in research publications.

Consent to Participate and Consent to Publish: All authors agreed with the content, and all gave explicit consent to submit. All authors obtained consent from the responsible authorities at the institute/organization where the work has been carried out before the work was submitted.

Author Contributions: V.M.P. and T.G.S. proposed the idea and concept; V.M.P. conducted the interviews in Portugal and Spain under the supervision of T.G.S. and J.S.S.; the English version of the final document was written by V.M.P., T.G.S. and J.S.S.; all authors revised and edited the manuscript. All authors have read and agreed to the published version of the manuscript.

Competing Interests: The authors declare no conflict of interest.

Data Availability Statement: The datasets produced and/or analyzed during the current study are available in Portuguese language, from the corresponding author on reasonable request.

Funding: This research was supported in part by the Military Academy Research Center (CINAMIL) under the project Anti-Drone.

Acknowledgments: The authors thank the Portuguese institutions Academia Militar, and the Guarda Nacional Republicana, and also the Spanish institution Guardia Civil, for the support provided to carry out this work.

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