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The use of remotely piloted aircraft by the Amazonas Military Police: efficiency and positive impacts on police operations.

The Use of Remotely Piloted Aircraft by the Military Police of Amazonas: Efficiency and Positive Impacts on Police Operations

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Summary

This article analyzes the use of Remotely Piloted Aircraft (RPAs), or drones, by the Military Police of the State of Amazonas (PMAM), discussing their efficiency and positive impacts on police operations in a vast territory with dense forest cover and a complex hydrographic network, which favors occurrences such as drug trafficking and environmental crimes. It begins with the problem of how these aircraft can influence the planning and execution of patrols, missions, and the prevention and resolution of crimes in the Amazonian context. The overall objective is to discuss the importance of using RPAs in the PMAM, evaluating their efficiency, identifying positive impacts on the reduction and resolution of incidents, and proposing recommendations to optimize their use. Methodologically, an exploratory and descriptive approach is adopted, with bibliographic and documentary research based on legislation, aviation regulations, and scientific publications on public security and drone technology. The results indicate that RPAs (Remotely Piloted Aircraft) expand real-time monitoring capabilities, especially in hard-to-reach areas, reduce risks to teams, contribute to crowd control and large events, and strengthen the fight against environmental crimes, drug trafficking, and other threats to public order, provided that current regulations are observed and operators receive continuous training.

Keywords: Drones. Public safety. Amazonas Military Police. Aerial monitoring. Police technology.

Abstract

This article analyzes the use of Remotely Piloted Aircraft (RPAs), or drones, by the Military Police of the State of Amazonas (PMAM), discussing their efficiency and positive impacts on police operations in a vast territory with dense forest cover and a complex hydrographic network, which favors occurrences such as drug trafficking and environmental crimes. It begins with the problem of

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Keywords: Drones. Public safety. Amazonas Military Police. Aerial surveillance. Police technology.

INTRODUCTION

The main objective of this article is to present information on the use of unmanned aerial vehicles (drones) in various operations of the Amazonas Military Police.

One cannot think about public safety without highlighting the importance of advancements. Technological advancements are emerging in various fields. Among the most promising innovations is the use of drones or aircraft. Remotely piloted aircraft (RPAs), which have demonstrated a high transformative capacity for operations. police officers because it is a versatile and effective tool for both monitoring and accessing areas. difficult to access (PASSOS; KOVALSKI, 2024).

According to ANAC regulations (2024), remotely piloted aircraft (RPA) These are unmanned aircraft used for other purposes such as experimental, commercial or Institutional. The Military Police of the State of Amazonas (PMAM) plays an essential role. in the preservation of public order and the environment, through visible policing of Excellence in all 62 municipalities of the state.

In this context, drones emerge as a crucial tool for police operations. These remotely controlled aircraft offer a number of operational advantages that can... to be effectively applied by the PMAM. The RPAs with their unique flight capabilities, data collection Real-time data and monitoring enable the execution of complex police operations and high-risk approach without endangering human life, in addition to providing an aerial view. Detailed and comprehensive, essential for monitoring large areas and detecting activities. suspicions (SOUZA; HENKES, 2021). Furthermore, the State of Amazonas, in territorial terms, is the The largest in Brazil, featuring several unique characteristics, such as extensive and winding rivers, as well as dense vegetation. Forest cover that hinders the maintenance of public order and environmental protection, contributing for drug trafficking, among others (SANTOS; SANTOS, 2023).

According to Couto (2020):

> "The Brazilian Amazon is a primary and obligatory route for cocaine flows destined for Europe and Africa through a network formed from Brazil's connection with Guyana, Suriname, and the Andean countries. And the Amazon basin necessarily becomes a..."

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A major cocaine corridor that also supplies the Brazilian market.

Drones can cover large areas quickly and efficiently, accessing locations that...
They would be inaccessible or time-consuming to reach by land. Furthermore, it possesses the ability to...
Capturing images in real time and transmitting them to the command center, enabling rapid response.
performance (COUTO, 2020).

The Military Police plays an essential role in maintaining public order and in
Promoting the safety of citizens throughout the country, as well as in the state of Amazonas. Its
The functions take place in a wide variety of activities, from visible policing and prevention.
crime investigation, environmental enforcement, among others. The relevance of their duties and the effectiveness with which they
performing these functions is extremely important for maintaining public order and the
A sense of protection for the Amazonian population. However, to face the challenges of the present day.
in public security in a state with a vast territorial extension and geographical complexity
In this region, it is necessary to adopt innovative strategies and incorporate cutting-edge technologies.
in their operations, such as with drones.

In this context, the use of remotely piloted aircraft (RPAs), popularly known as
Known as drones, they emerge as a promising technological alternative capable of transforming
significantly impacted police operations, both conventional policing and troops.
specialized, since they enable the execution of complex operations – whether by areas
remote locations that are difficult to access, or due to the risk of exposure - without directly endangering the agent,
Since the equipment is controlled remotely, it also allows for a wide view of the area.

The academic relevance of the topic lies in the need to deepen studies on the subject.
Efficiency and the impacts of drone use on public safety. Furthermore, research can
To provide evidence on best practices to be adopted in daily policing. In addition
These aircraft stand out due to their ability to perform tasks that are generally...
performed by manned police aircraft, this includes activities such as capturing images.
and videos from strategic locations, which significantly minimizes operational costs.
(TOLENTINO, 2024).

This article aims to discuss the importance of using RPAs (Remotely Piloted Aircraft) in law enforcement.
Military Police of the State of Amazonas (PMAM), highlighting how this technology can improve the
The efficiency and effectiveness of police actions. Specific objectives include: 1. Evaluating efficiency
1. Regarding the use of remotely piloted aircraft in operations by the Amazonas Military Police; 2.
1. Identify the positive impacts on reducing and resolving incidents; 2. Propose recommendations.
for optimizing the use of drones in the corporation.

How can the use of remotely piloted aircraft influence planning?
The execution of patrols, missions, and the prevention and resolution of crimes within the military police.

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From the State of Amazonas?

It is hypothesized that the use of RPAs (Remotely Piloted Aircraft) by the Amazonas military police has been...
employed as a multi-mission tool in the realm of public safety, especially in
In hard-to-reach locations, the effectiveness of monitoring increases exponentially by providing...
comprehensive real-time aerial coverage. Furthermore, the presence of these aircraft provides...
a deterrent effect on criminal activities, allowing the PMAM (Military Police of Amazonas) to intervene in a way...
Quick and efficient in performing their missions, minimizing risks for the teams involved.

Another important factor is its use in crowd control and public events. According to
Passos and Kovalski (2024):

> "During large public events and demonstrations, crowd management is a constant challenge. RPAs (Remotely Piloted Aircraft Systems) can monitor the movement of people, identify potential disturbances, and provide real-time data on crowd density. This information is vital for the efficient allocation of resources and the prevention of incidents."

This shows that, taking into account the scope of the territorial space
In the Amazon region, the use of these technological devices represents an advance in capacity.
The operational capacity of the PMAM (Military Police of Amazonas) provides a more effective response to the various threats facing the State.
The Amazon faces...

In this work, we chose to adopt the following approach as our theoretical and methodological basis.
exploratory and descriptive, which allows for a greater understanding, familiarity, and analysis of the topic.
addressed (GIL, 2008). Bibliographic research was chosen as the study method. For the
Scientific articles, theses, and studies relevant to the topic were used in the preparation of this study, as well as websites.
of the internet and standards.

Bibliographic research, also known as a literature review, consists of selecting,
Reading and analysis of all the bibliography that has been made public, especially books and journals. And
Documentary information (ANAC RBAC – E 94/2024 standards, PMAM reports) will also be analyzed.
cases that did not receive analytical treatment or can be re-approached according to the
research objectives, based on research into laws and case law, if any. For Martins and
Theophilo (2016, p. 52)

Thus, bibliographic research is an essential component in the development
scientific, expanding possibilities and deepening the understanding of diverse areas of knowledge.

2. USE OF REMOTELY PILOTED AIRCRAFT IN OPERATIONS OF THE MILITARY POLICE OF AMAZONAS;

The Military Police is an institution divided into different segments, but always acting in concert.
in a synergistic way to achieve its institutional mission: to guarantee the preservation of public order and
of the environment. The focus of the Military Police is on visible policing, preventing and suppressing crime.

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The practice of crimes. The objective of the PMAM (Military Police of Amazonas) is to preserve public order and guarantee the safety of the population.
The population, through visible policing, which includes routine actions and patrols,
River patrols, street inspections, as well as support for the execution of search warrants and
seizure (PMAM, 2023).

In view of this, based on the above understandings, it can be inferred that public safety is...
a set of measures belonging to a community that aims to ensure personal protection and
property of its members, in addition to the prevention, control and repression of crimes by the
Public Administration (PASSOS; KOVALSKI, 2024).

However, to address the urgent public safety challenges in a vast region
Like the state of Amazonas, the PMAM (Military Police of Amazonas) must adopt innovative strategies and integrate technologies.
advanced in their operations (PMAM, 2023).

In this context, the use of remotely piloted aircraft (RPAs), popularly known as
Known as drones, they are proving to be an effective technological solution in police operations.
These remotely controlled aircraft offer a number of operational advantages that can...
to be applied in order to maximize the various police operations (PASSOS; KOVALSKI, 2024).

The discussion about the use of RPA by the Military Police of Amazonas (PMAM) and its
The impact on police operations reveals the depth and complexity of its applications.
RPA technology has become an indispensable tool in various fields of activity.
bringing significant advances in both environmental protection and the safety of public events.
(BUSKI; SILVA, 2022).

According to the National Civil Aviation Agency (ANAC):

> RPAs are those in which the pilot is not on board, but controls the aircraft remotely through an interface (computer, simulator, digital device, remote control, etc.).
> Unlike another subcategory of UAV, the so-called "Autonomous Aircraft," which, once programmed, does not allow external intervention during flight and whose use is prohibited in Brazil, the term RPA (Remotely Piloted Aircraft) is the correct terminology when referring to remotely piloted aircraft for non-recreational purposes.

Furthermore, the use of RPAs in monitoring the Amazon allows for an approach
More strategic and efficient than traditional methods. Remote access and aerial coverage.
They enable the identification of critical areas and the mapping of changes in the environment with greater precision.
precision. The images and data collected can be analyzed to detect patterns of
deforestation and other illegal activities, facilitating the implementation of preventive strategies and
corrective measures. This not only improves the effectiveness of police operations, but also contributes to...
conservation of ecosystems and protection of biodiversity (ALMEIDA; FONSECA, 2018).

RPA also plays an important role in obtaining databases.
detailed information about the state of the monitored areas. The collected images and videos can be used
to generate reports that document environmental conditions and interventions carried out

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(PARANHOS FILHO; et al, 2021).

This type of documentation is fundamental for the analysis of long-term trends and for evaluating the effectiveness of implemented policies and actions. Furthermore, the ability to provide Visual and detailed evidence can be crucial in legal proceedings and investigations into environmental crimes (FREDERICO; SILVA; OLIVEIRA JÚNIOR, 2021).

In the context of crowd control and public events, drones offer a range of... Advantages that improve management and safety. The ability to conduct aerial surveillance in Real-time monitoring allows for constant monitoring of the public and infrastructure, facilitating... Identifying problems and coordinating security teams. Analyzing the images. Images captured by drones can help predict and mitigate risky situations, such as crowds. excessive or suspicious behavior. This proactive approach is essential to ensure the safety and well-being of participants (DANTAS JÚNIOR FARIAS, 2021).

Furthermore, RPAs can be used to assess the effectiveness of security measures and to adjust strategies as needed. Real-time data collection allows for analysis. Continuous monitoring of the situation allows for quick and informed adjustments to security operations. This is This is especially important in dynamic events, where conditions can change rapidly and the Response capability must be agile and well-coordinated. The use of RPA, therefore, not only improves the safety, but it also contributes to a safer and more organized experience for everyone. involved (LIMA; OLIVEIRA; COSTA, 2021).

POSITIVE IMPACTS ON REDUCING AND RESOLVING INCIDENTS

Implementing RPAs for monitoring offers several significant advantages. Firstly, they allow for extensive and continuous coverage of remote regions, which many Sometimes they are inaccessible by other means. This is especially relevant in the Amazon, where the vastness The size of the areas and the dense vegetation make conventional monitoring a considerable challenge. With RPA technology, it is possible to carry out comprehensive and detailed aerial surveillance of the terrain. enabling the identification of changes in land cover and vegetation with greater precision. early identification of illegal activities, including deforestation, fires, drug trafficking and The occupation of indigenous territories is made possible through this comprehensive monitoring. It helps in tracking criminals in remote locations and targeting sensitive targets, such as executing warrants. search and seizure and arrest, while also allowing for the rapid and efficient application of corrective actions (OLIVEIRA, 2023).

3.1 Support for police operations

Along with detailed visualization, drones equipped with specialized sensors provide The ability to collect crucial data. Incorporating RPA in the fight against crime increases the...

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effectiveness of law enforcement operations. By replacing or augmenting conventional methods such as Ground patrols and aerial surveys conducted by airplanes or helicopters, RPAs feature A more economical and adaptable alternative. They can undertake extended flights with a high degree of safety. autonomy, allowing them to research extensive areas in a shorter period. This efficiency Increased efficiency not only reduces operating expenses but also facilitates more efficient application. regular and complete (SALES, 2020).

Furthermore, RPA technology enables the creation of high-resolution images and videos. which can be used to document infractions and crimes committed. This material is essential for preparing detailed reports and conducting comparative analyses to over time (SALES, 2020). Visual documentation can also be used in processes legal, providing concrete evidence about the situation of the monitored areas and the corrective actions. carried out (VIEIRA, 2017).

RPA has the ability to instantly capture and retransmit images and data to ground operations teams, facilitating a quick and efficient response to situations that require it. intervention. This ability to respond quickly is particularly vital in urgent circumstances. such as forest fires or violations of protected areas (PASSOS; KOVALSKI, 2024).

The ability to communicate in real time allows response teams to coordinate. their actions effectively and make informed decisions, thereby increasing the chances of containing and successfully solving crimes. Furthermore, the use of drones for real-time monitoring offers advantages for strategic planning and management (ANDRADE JÚNIOR, 2023).

3.2 Crowd control

Drones are currently employed in various areas of operation within the institution. being used by the Air Patrol Group (GRAER) in events such as Parintins Festival 2024 and 2025, monitoring crowds, identifying suspects and optimizing Real-time responses. Before being integrated into Operation Parintins, drones had already been... used in visible patrol operations in Manaus. The introduction of technology at the festival, Launched in 2024, it generated positive results and was maintained for the 2025 edition.

The use of RPA (Remotely Piloted Aircraft) in crowd control and public events represents progress. significant in the security and coordination of large events. By providing a vision In panoramic and real-time views, drones help monitor the public, identify problems, and... Coordinate security more effectively. This innovative technology not only improves management. of the events, but it also contributes to a safer and better-organized experience for everyone. those involved (COSTA, 2019).

In addition to providing a comprehensive view, drones also play a role. Crucial in event logistics. They are valuable tools for evaluating and planning events.

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site configurations, contributing significantly to the efficient preparation and execution of event (COSTA, 2019). Before the start of the event, drones can carry out an aerial survey. Detailed site plan, offering an overview of the installation areas and configurations. necessary (SOUZA; ZANUNCINI, 2023).

These pre-event assessments are essential to identify critical points that may require special attention. For example, drones can help verify the layout of the areas. Access routes should be assessed, potential obstacles identified, and evacuation routes ensured are clearly marked. defined and unobstructed (SOUZA; ZANUNCINI, 2023).

The ability of RPAs to perform continuous patrols is one of their greatest advantages. Equipped with high-resolution cameras and advanced sensors, drones can monitor wide areas. areas of the event are constantly monitored in real time (PEZZINI; TORRES, 2018).

This aerial surveillance allows for the identification of potentially problematic situations. Before they become serious. For example, detecting petty theft and drug dealing. enabling a quick and targeted intervention (LIMA, 2019).

3.3 Environmental monitoring

Drones provide numerous notable benefits for environmental monitoring. They They allow for extensive and continuous observation of remote areas that are often difficult to reach. access through traditional methods. This is particularly significant in regions such as The Amazon, where the size and dense vegetation present substantial challenges for the Conventional monitoring. The use of drone technology allows for aerial surveillance. complete and accurate landscape mapping, facilitating the detection of changes in land cover and vegetation. vegetation. This meticulous monitoring helps in the rapid identification of illegal activities, including deforestation and fires, and supports the rapid implementation of corrective actions. effective (OLIVEIRA, 2023).

In addition to providing a broader view of the current situation of the surrounding environment, drones Equipped with specialized sensors, they have the potential to collect crucial environmental data. Analyzing data in real time enables a faster response to environmental challenges and helps... to develop more efficient preservation strategies (GONÇALVES, 2021).

The use of drones in environmental surveillance also optimizes the work of inspection. efficient way. As a replacement for or complement to conventional approaches such as patrols. On land and in aerial inspections using traditional airplanes or helicopters, drones stand out as... A more affordable and versatile solution. They are capable of extended flights with sufficient range. remarkable, and they can cover vast areas in a short amount of time. This efficiency not only reduces operational costs, but it also enables more frequent and comprehensive monitoring (SALES, 2020).

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The Military Police of Amazonas (PMAM), through the Environmental Policing Command (CPAmb) uses drones as a monitoring tool in its various operations, such as in the course of Operation Tamoiotatá. Where, the military police identified, from the Room

The Environmental Command and Control Center (Sapopema) reported that an area was being deforested at kilometer marker [number missing in original text].

60 of Highway AM 070. The teams arrived at the scene and, with the help of the RPAs, managed to... to identify the area that was being deforested, as well as to identify those responsible for committing the acts. environmental crimes. These actions carried out by the corporation demonstrate a new scenario for Public safety, especially for PMAM (PMAM, 2023).

3.4 Cost containment

Although purchasing drones and training their operators requires an investment. Initially, operating costs tend to be lower. These devices can replace Helicopters and airplanes are used in various surveillance missions, resulting in significant cost savings. of resources, mainly in relation to maintenance and fuel consumption (PASSOS; KOVALSKI, 2024).

In terms of reducing costs associated with air navigation, this equipment is very... inferior when compared to manned flight equipment, and their use can guarantee greater Safety for police officers, in other words, they pose less risk to operators. Fixed-wing aircraft Manned rotary or aeronautical turbines have high costs not only to acquire, but also to maintain. maintenance. Although more accessible and low-cost, they are used as a tool for observation that assists police activity, without operating tactically in police events or even rescue (SOUZA; HENKES, 2021).

4. OPTIMIZING THE USE OF DRONES IN CORPORATIONS.

Optimizing the use of drones in the Amazonas Military Police (PMAM) involves specialized training, integration with tactical operations and advanced equipment for Monitoring in hard-to-reach areas, such as rivers and forests.

The PMAM conducts training and capacity building through courses with partners such as Ministry of Justice, National Force and Sema, encompassing piloting, mapping and processing. Images and ANAC legislation and tactical practices, as well as ANAC certification. Recent instructions. They include drones with 400x zoom, thermal and night vision, preparing police officers for tactical use. against crime.

Optimization Strategies: Integration with ground teams via radio for rapid responses. in riots or crowd flows. Real-time logistics analysis for police reinforcements and crime prevention.

In Brazil, we have several bodies that regulate the use of RPAs (Remotely Piloted Aircraft), most notably the Agency...

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The National Civil Aviation Agency (ANAC) and the National Telecommunications Agency (ANATEL) and the Department of Airspace Control (DECEA).

In light of this, the air traffic control and protection agencies have established regulations capable to minimize risks to the security of the State and the population.

For security teams involved in the use of RPA, it is crucial to ensure that all operations must be in full compliance with regulations. This begins with obtaining the authorizations required for the operation of drones in specific areas, especially in zones protected areas or areas with high population density. In many cases, drone operation requires... approval from aviation regulatory bodies or local authorities, which establish the conditions and restrictions for the use of these technologies (DANTAS JÚNIOR FARIAS, 2021).

The exchange of information and collaboration with other entities also play a role. A crucial role in maximizing the benefits of RPA. Participate in international networks and forums. about drone technology, collaborate on joint projects and exchange experiences with others Organizations can provide valuable insights into best practices and new approaches. These Knowledge sharing allows security teams to stay up-to-date with the latest developments. emerging trends and can apply innovations that have proven successful in other contexts. (MONTEIRO, 2016).

Furthermore, it is important to highlight the implementation of internal policies that establish Clear limits on the use of drones and data collection. These policies should define who has the right to operate them. access to the collected information, how the data will be protected, and how long it will be retained. Adopting cybersecurity practices to protect data against unauthorized access. It is also crucial to ensure the integrity and confidentiality of information (FREDERICO; SILVA; OLIVEIRA JÚNIOR, 2021).

FINAL CONSIDERATIONS

The use of RPAs in police operations by the Military Police of Amazonas (PMAM) This represents a significant evolution in monitoring and public safety strategies. RPAs offer a unique data collection and surveillance capability, enabling more efficient management. Effective coverage of vast areas and large-scale events. This technological advancement provides a view Comprehensive and detailed information is essential to combat the various crimes plaguing the State.

In the environmental context, drones play a crucial role in monitoring remote areas and in monitoring illegal activities, such as deforestation and wildfires. The capacity Capturing high-definition aerial images and collecting real-time environmental data improves significantly improves the response and intervention capacity of the Environmental Battalion. This technology It not only allows for more effective surveillance, but also facilitates detailed analysis of the conditions.

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environmental, contributing to the preservation and sustainable management of natural resources.

At large events, drones offer substantial advantages in security and safety management. Logistics. The panoramic view provided by drones allows for efficient monitoring of... public, the identification of petty theft, drug trafficking and behaviors suspects, and the coordination of security teams. In addition, RPAs assist in the assessment of site configuration and identification of critical points, ensuring that the infrastructure is properly and that the event runs smoothly.

However, the effective integration of drones into operations requires careful attention to Several aspects are considered, including compliance with legal regulations and ensuring respect for privacy. It is essential that security teams are aware of current laws and adopt best practices. that ensure the ethical and legal operation of drones. Furthermore, continued investment in Cutting-edge technology and specialized training are crucial to maximizing the benefits of drones and to ensure the effectiveness of operations.

Collaboration and exchange of experiences with other institutions and participation in networks. International interactions are equally important. These interactions provide valuable insights into best practices and new approaches, enabling continuous adaptation and innovation in operations. monitoring and security.

In summary, RPAs offer substantial benefits by improving the ability to... monitoring, intervention, and coordination. The success in using this technology will depend on an ongoing commitment to technological updating, regulatory compliance and training. specialized. With a well-structured approach and adequate investments, RPAs have the potential to significantly transform the effectiveness of public safety operations.

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