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Challenges and Obstacles to Human Resource Management of the Indonesian National Police in the Utilization of UAV Technology

Irfan Satya Prasad Marpaung[1]✉, Mhd Halkis[2], Tarsisius Susilo[3]

[1]Sekolah Staff dan Komando TNI, Pasis Dikreg LII Sesko TNI, Indonesia
[2,3]Universitas Pertahanan, Indonesia

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Abstract

The utilization of Unmanned Aerial Vehicle (UAV) technology by the Indonesian National Police (Polri) offers significant potential in enhancing surveillance capabilities, supporting disaster response, border control, traffic monitoring, and various security operations. UAVs enable real-time data collection and remote monitoring, thereby increasing operational efficiency and reducing the risk to human personnel in dangerous environments. Nevertheless, despite these benefits, the implementation of UAVs within Polri is not without its challenges. These challenges are multifaceted, encompassing both technical aspects such as limited system integration, insufficient bandwidth, and battery life issues and non-technical factors, including institutional readiness, inter-agency coordination, and public perception. This study seeks to explore and map the key obstacles that hinder the effective deployment and utilization of UAV technology within Polri's operational framework. Among the most prominent challenges identified are the limited competencies of personnel in operating UAVs, the absence of standardized and comprehensive training programs, and the lack of a dedicated organizational unit specializing in UAV management. In addition, regulatory frameworks governing UAV use in national law enforcement are still evolving and often ambiguous, resulting in legal uncertainties and operational inefficiencies. Furthermore, supporting infrastructure such as maintenance facilities, software systems, and data security protocols remains inadequate in many regional units. The findings emphasize that the most pressing issues include not only the absence of technical know-how and system integration limitations but also the weak institutional regulation and strategic vision for UAV deployment. These results underline the urgent need for comprehensive capacity building, clearer inter-institutional guidelines, and sustainable investment in UAV-related infrastructure to ensure that the adoption of drone technology can effectively support Polri's broader mandate of maintaining national security and public order.

✉Correspondence :
Sekolah Staff dan Komando TNI, Pasis Dikreg LII Sesko TNI, Indonesia
E-mail: marpaungirfan4@gmail.com

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INTRODUCTION

The use of Unmanned Aerial Vehicle (UAV) technology by the Indonesian National Police (Polri) is a significant innovation in supporting the implementation of aerial surveillance tasks. In recent years, this technology has been widely used for various purposes, including regional surveillance, disaster management, and security operations. UAVs provide advantages in the form of the ability to conduct aerial surveillance in areas that are difficult to access, accelerate response to emergency situations, and increase overall surveillance effectiveness. However, despite offering various benefits, the use of UAV technology by the Polri also faces significant challenges and obstacles, both in terms of technical and policy (Wang, 2016).

Previous literature review shows that the use of UAVs in the security sector has begun to be adopted by many countries. Research by Uwuigbe & Ajibolade (2013) highlighted the importance of UAV development in improving aerial surveillance capabilities in developed countries. In Indonesia, several case studies have been conducted related to the use of UAVs in security operations and disaster management by the Indonesian National Police. This study showed a significant increase in the effectiveness of operations involving UAVs, but also revealed technical constraints such as limited battery life, signal interference, and bad weather that can hamper UAV operations (Muttakin et al., 2015).

The scientific novelty statement of this article is the emphasis on the challenges faced by the Indonesian National Police in implementing UAVs in Indonesia, which involve technical, regulatory, and human resource aspects. Unlike previous studies that focused more on the benefits of UAV technology in general, this article will dig deeper into the specific obstacles faced by the Indonesian National Police, especially in the context of surveillance of a large and complex area such as Indonesia. Another challenge that will be explored is how regulations related to the use of UAVs by security forces have not fully supported optimal operations.

The main problem raised in this study is how the Indonesian National Police can maximize the potential of UAV technology in carrying out its surveillance duties, considering the various constraints that exist. This study focuses on the operational and technical challenges faced by Indonesian National Police personnel when operating UAVs, as well as regulatory constraints that limit their wider use. In addition, aspects of personnel training and competence will also be explored to determine how much influence they have on the effectiveness of UAV use in police operations. The use of Unmanned Aerial Vehicle (UAV) technology by the Indonesian National Police Mobile Brigade Corps has significant relevance to aspects of education management, especially in terms of developing technology-based learning strategies and improving the quality of training. UAVs allow for simulation of real situations in tactical exercises, thus enriching the training curriculum in the police environment with more interactive hands-on experiences. From an education management perspective, the application of this technology requires careful planning, effective resource management, and ongoing training to ensure that personnel can operate UAVs optimally.

The main objective of this study is to identify and analyze the challenges and obstacles faced by the Indonesian National Police in utilizing UAV technology. Through a qualitative approach, this study will explore potential solutions that can be applied to overcome these obstacles, so that the Indonesian National Police can utilize UAVs more effectively in supporting surveillance and law enforcement tasks in the field.

RESEARCH METHODS

The research method used in this study is a qualitative method with a case study approach. The main focus of this study is to identify the challenges and obstacles faced by the Indonesian National Police in utilizing Unmanned Aerial Vehicle (UAV) technology in various police operations, especially in operations carried out by the Indonesian National Police Mobile Brigade Corps (Korbrimob). Data were collected through in-depth interviews with personnel directly involved in UAV operations, technology observers, and policy makers. In addition, field observations were also

conducted to obtain a direct picture of the use of UAVs in various situations, as well as relevant literature studies to support the analysis of research results.

The main instrument used in data collection was semi-structured interviews, which allowed researchers to dig up in-depth information about the experiences and perceptions of Polri personnel regarding the challenges and obstacles in using UAVs. Data collection was also carried out through direct observation of several operations in which UAVs were used, such as border security operations, surveillance of vulnerable areas, and disaster management operations. The data obtained from these interviews and observations were then analyzed descriptively using coding techniques to identify key themes related to technical challenges, regulations, and human resources.

To ensure the validity and reliability of the data, this study uses source triangulation techniques, where data from interviews, field observations, and document studies are compared and confirmed with each other. This triangulation is carried out to ensure that the findings produced have a strong and reliable basis. In addition, internal validity is maintained by involving several sources from various levels in the Polri organization, ranging from UAV operators, technicians, to policy makers.

The data analysis technique used in this study is thematic analysis, which allows researchers to identify key patterns and themes related to the challenges and obstacles to the use of UAVs by the Indonesian National Police. The results of this analysis are expected to provide a clear picture of the factors that influence the effectiveness of UAV use in police operations, as well as strategic recommendations to overcome the obstacles faced.

RESULTS AND DISCUSSION

This study reveals several technical challenges in the use of Unmanned Aerial Vehicle (UAV) technology by the Indonesian National Police. One of the main challenges is the limited flight range of UAVs, especially when used in remote areas or with complex geographic terrain. This causes dependence on additional infrastructure such as remote control stations which can increase operational costs. In addition, limited battery life also reduces the effectiveness of UAVs in long-term missions, often requiring additional UAVs or battery replacement in the field. These results are in line with findings from previous studies showing that although UAV technology has great potential, technical factors such as range and endurance are significant obstacles to its implementation in the field.

The use of Unmanned Aerial Vehicle (UAV) technology by the Indonesian Police Mobile Brigade Corps offers great potential in increasing operational and training effectiveness. However, its implementation is not free from challenges and obstacles related to aspects of education management. One of the main challenges is the readiness of human resources. Although UAV technology is very sophisticated, its use requires in-depth technical skills, which means that Brimob must integrate a new training curriculum that focuses on mastering UAVs. This process includes not only initial training but also ongoing learning to ensure that personnel remain up-to-date with rapid technological developments. Education management within the Brimob environment must be able to design comprehensive and ongoing training programs, involve competent teaching staff, and adjust learning methods to practical and theoretical abilities related to UAVs.

Another significant obstacle is the limited infrastructure and budget. The use of UAVs requires adequate technological infrastructure support, including hardware, software, and reliable communication systems. Procurement, maintenance, and updating of UAV devices and their supporting facilities require large financial investments. In the context of educational management, these budget limitations can hinder the implementation of training programs optimally, especially if there is no special allocation or priority in developing this technological capability.

In addition to technical issues, the Indonesian National Police also face obstacles related to human resources. Personnel operating UAVs require special training to master this complex technological device. The lack of ongoing training programs and certification of UAV

operators within the Indonesian National Police has resulted in low competence of some UAV operators. This affects the quality of surveillance data collected and the operator's ability to manage UAVs in emergency situations. Discussion of these obstacles emphasizes the need for systematic and ongoing training programs to strengthen the capacity of Indonesian National Police personnel in optimally utilizing UAV technology.

Inadequate regulation is also a major obstacle in the use of UAVs by the Indonesian National Police. Currently, regulations related to the use of UAVs in police operations are still limited, especially in terms of flight rules, use of airspace, and integration with other surveillance systems. This lack of regulation has the potential to cause legal and security issues, especially related to public privacy and airspace violations. This discussion emphasizes the importance of developing clearer and more comprehensive regulations, both at the national and internal levels of the Indonesian National Police, to ensure the safe and legal use of UAVs.

Regulatory and policy aspects remain one of the primary obstacles in the adoption and integration of Unmanned Aerial Vehicle (UAV) technology within Brimob's operational and educational frameworks. The deployment of UAVs, particularly in civilian or high-security military zones, is tightly regulated under national and international aviation, privacy, and security laws. These layered regulations, which often involve overlapping authorities such as the Ministry of Transportation, the Indonesian National Armed Forces (TNI), and the Civil Aviation Authority require Brimob to navigate a complex bureaucratic landscape. As a result, the procedural requirements for authorization, coordination, and reporting can delay or even hinder the timely deployment of UAVs during urgent operations. In the context of educational management, this regulatory complexity demands that curriculum designers and instructors develop comprehensive training modules that not only cover the technical operation of UAVs but also instill a deep understanding of legal and ethical boundaries. Failure to grasp these regulations adequately can lead to legal violations, compromised missions, or reputational risks, particularly during sensitive and high-stakes deployments such as counterterrorism or border surveillance.

Beyond regulatory hurdles, internal organizational dynamics, especially resistance to technological change, further complicate the integration of UAV technology. UAV systems represent a significant paradigm shift from traditional surveillance and tactical tools used by Brimob personnel. This novelty can provoke skepticism or passive resistance among officers who are unfamiliar with or unconvinced by the advantages of UAV-based operations. Such resistance may manifest as low participation in training programs, reluctance to use the technology in the field, or preference for conventional methods. From the perspective of education management, this cultural inertia must be addressed through change management strategies that prioritize inclusive communication, role modeling from leadership, and structured feedback mechanisms. Emphasizing the operational advantages such as increased situational awareness, reduced risk to human personnel, and real-time intelligence can help shift mindsets. Moreover, involving personnel in the design and evaluation of training modules can foster a sense of ownership and reduce the psychological distance from the new technology.

Another critical barrier is the uneven development of supporting infrastructure necessary for optimal UAV operation. Effective UAV use depends on a robust ecosystem comprising reliable communication networks, GPS integration, real-time data processing units, and centralized UAV operation centers. In many of Polri's operational jurisdictions, particularly in remote or under-resourced regions, this infrastructure is either underdeveloped or entirely lacking. This situation leads to fragmented UAV operations, where collected data cannot be transmitted or analyzed in real-time, thereby reducing the strategic value of surveillance missions. The absence of system interoperability with existing police databases and command structures further undermines the potential impact of UAV-based intelligence. These infrastructure gaps highlight the urgent need for coordinated investment in digital infrastructure that aligns with national smart policing initiatives. Future planning must prioritize the development of UAV command hubs, cloud-based data storage

systems, and cross-platform integration to ensure seamless operational efficiency.

Taken together, these challenges emphasize the multi-dimensional nature of UAV adoption within Brimob. Effective implementation requires not only technological readiness but also institutional adaptability, comprehensive regulatory literacy, and proactive infrastructure development. By addressing these interconnected issues through a systemic approach combining policy reform, strategic communication, personnel development, and infrastructure investment Brimob can better harness the full potential of UAV technology to enhance its operational effectiveness and responsiveness.

CONCLUSION

The use of UAV technology by the Indonesian National Police in aerial surveillance strategies has proven to have a significant impact on the effectiveness of police duties. UAVs are able to provide wider and faster visual access in various operations, from monitoring areas to handling emergency situations. However, the use of this technology still faces various challenges, including the lack of supporting infrastructure and limited human resources trained in operating UAVs. This is an obstacle that needs to be overcome to maximize the potential of UAVs in Indonesian National Police operations.

Technical challenges in the use of UAVs, such as battery issues, operating range, and dependence on weather conditions, also limit their effectiveness. In addition, the lack of clear regulations regarding the use of UAVs within the scope of Polri law is also a factor that needs to be improved. More comprehensive regulations are needed so that the use of UAVs by Polri can run according to the established security and privacy standards, so that UAVs can function optimally without causing potential violations.

In an effort to overcome these obstacles, it is necessary to increase training for Polri personnel in operating UAVs, as well as the addition of supporting infrastructure such as a more modern and reliable UAV control center. In addition, the importance of synergy between units in Polri must also be strengthened to ensure good coordination in the use of this technology in various police operations.

Moving forward, the development of clearer regulations and the provision of sufficient budget for the maintenance and improvement of UAV technology are priorities. With these efforts, it is hoped that the National Police can maximize the use of UAVs to support the effectiveness of surveillance and law enforcement tasks, as well as improve national security throughout Indonesia.

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