Journal of Advanced Studies in Aviation, Aerospace, and Management
2026, ISSN 3062-4460
Volume 1 Issue 4
https://doi.org/10.70838/jasaam.010403
Received: 5 July 2025 Accepted: December 15, 2025

RESEARCH ARTICLE

Perception of Aviation Professionals Towards Unmanned Aircraft Systems

Author/s: Lester Nash D. Molina,* Alfonso Josh I. Atienza, Patricia Mae O. Godinez, Apple Mae Valiao, Kimberly N. Cui-Toring, Eugene E. Toring, and Jhoselle Tus

Corresponding author email: *molinaln94@gmail.com*
Affiliation: Indiana Aerospace University

Abstract

Unmanned Aircraft Systems (UAS) have gained widespread adoption across various industries worldwide, including military operations, agriculture, logistics, and search-and-rescue missions. In the United States, UAS are extensively utilized for emergency response and commercial applications, while several Asian countries, including the Philippines, have adopted UAS technologies in agriculture, delivery services, and aerial surveillance. Despite their advantages in efficiency, cost-effectiveness, and operational safety, the integration of UAS into civil aviation systems remains constrained by concerns related to privacy, safety, cybersecurity, and regulatory limitations. This study investigated the perceptions of aviation professionals toward Unmanned Aircraft Systems, focusing on safety and security, facilities and equipment, and overall perceptions. Conducted at Mactan–Cebu International Airport from January 2022 to April 2023, the study employed a quantitative research design involving five groups of aviation professionals: pilots, cabin crew, air traffic controllers, ground crew, and Philippine Air Force personnel. Data were collected using a structured survey questionnaire employing a five-point Likert scale. Statistical treatments included simple rate, weighted mean, and ranking. Findings revealed that aviation professionals generally agreed on the potential benefits of UAS in terms of safety, security, facilities, and operational capability. However, the study identified five major challenges: vulnerability to cyberattacks, fear of job displacement, difficulty integrating UAS into existing aviation infrastructure, insufficient regulatory frameworks, and limited accessibility due to high equipment costs. The results underscore the need for comprehensive regulations, enhanced cybersecurity measures, and increased professional awareness to support the responsible integration of UAS into the aviation industry.

Keywords: Unmanned Aircraft Systems, Aviation Professionals, Safety and Security, UAS Regulation, Aviation Technology

Introduction

The aviation industry is a continuously evolving sector driven by technological advancements and operational demands. One of the most significant innovations in recent decades is the development and deployment of Unmanned Aircraft Systems (UAS), commonly referred to as drones. These systems have been widely adopted across the globe, particularly in the United States, Asia, and the Philippines, for applications ranging from military operations and agricultural monitoring to package delivery and disaster response. In the United States, agencies such as the Federal Emergency Management Agency (FEMA) have employed UAS to collect aerial imagery during natural disasters, enabling rapid damage assessment and improving emergency response efficiency.

In Asia, UAS technology has seen rapid growth, particularly in agriculture and logistics. Major technology companies such as DJI and Alibaba have invested heavily in drone-based solutions to enhance productivity and delivery efficiency. In the Philippines, UAS have been used for aerial mapping, surveying, traffic monitoring, and security operations, especially during the COVID-19 pandemic. Despite these advancements, concerns surrounding privacy, airspace safety, and potential misuse—such as illegal surveillance and smuggling—have raised significant challenges to the widespread adoption of UAS.

While UAS offer advantages such as improved safety in hazardous operations, reduced operational costs, and increased efficiency, they also present risks related to air traffic safety, cybersecurity, and data privacy. These concerns prompted the International Civil Aviation Organization (ICAO) to issue Circular No. 328 – Unmanned Aircraft Systems in 2011, which provides guidance on the regulation and integration of UAS into global aviation systems. This framework aims to ensure that UAS operations are conducted safely and harmoniously alongside manned aircraft.

The present study is grounded in the legal provisions of ICAO Circular 328 and supported by established theoretical frameworks,

including Heinrich's Domino Theory (1931), which emphasizes accident causation and safety management; Bertalanffy's General Systems Theory (1968), which views aviation as an interconnected system; and Bandura's Social Cognitive Theory (1986, 1997), which explains how perceptions and experiences influence attitudes toward new technologies. These theories collectively support the examination of safety, system integration, and professional perceptions related to UAS.

Despite international efforts to regulate UAS operations, challenges persist. Privacy and security concerns arise from the ability of drones to capture images and data without consent, as discussed by McNeal (2014). Additionally, the difficulty in detecting and tracking drones poses risks to air traffic safety, with reported near-miss incidents involving commercial aircraft. Furthermore, the lack of clear and comprehensive regulations has led to uncertainty among aviation professionals and the general public regarding appropriate UAS usage.

Given these challenges, this study aims to examine the perceptions of aviation professionals toward Unmanned Aircraft Systems, focusing on safety and security, facilities and equipment, and overall perceptions. Conducted at Mactan–Cebu International Airport in Lapu-Lapu City, this research seeks to provide empirical insights into how aviation professionals view the integration of UAS into existing aviation operations. The findings are expected to contribute to policy development, operational planning, and educational initiatives that support the safe and effective adoption of UAS technologies.

Research Objectives

This study aims to investigate the Perceptions of Aviation Professionals towards Unmanned Aircraft Systems. Specifically, this study focuses on the following:

1. Determine the profile of the respondents in terms of: occupation, length of employment, and rank.
2. Investigate the Perceptions of Aviation Professionals towards Unmanned Aircraft Systems in terms of:
    2.1. safety and security,
    2.2. facilities and equipment; and
    2.3. perception.

Methodology

Research Design

This study employed a quantitative research design to assess aviation professionals' perceptions of Unmanned Aircraft Systems. A structured survey questionnaire using a five-point Likert scale was utilized to collect numerical data related to safety and security, facilities and equipment, and overall perceptions of UAS. Quantitative analysis enabled objective measurement and comparison of perceptions across different groups of aviation professionals.

Respondents

The participants of the study consisted of five groups of aviation professionals: pilots, cabin crew, air traffic controllers, ground crew, and Philippine Air Force personnel. These respondents were selected based on their professional roles, expertise, and direct involvement in aviation operations. Participation was voluntary, and informed consent was obtained from all respondents prior to data collection. Confidentiality and anonymity were strictly maintained throughout the study.

Instrument

Data were collected using a researcher-developed survey questionnaire distributed in either electronic or printed format. The instrument included a five-point Likert scale with the following descriptors: 5 – Strongly Agree, 4 – Agree, 3 – Uncertain, 2 – Disagree, and 1 – Strongly Disagree. The questionnaire consisted of items addressing safety and security concerns, adequacy of facilities and equipment, and general perceptions of UAS. A limited number of open-ended questions were also included to capture additional insights from respondents.

Procedure

Prior to data collection, the researchers secured approval from relevant authorities and coordinated with airport and aviation offices at Mactan–Cebu International Airport. The survey questionnaires were then distributed to selected aviation professionals over the study period from January 2022 to April 2023. Participants were given sufficient time to complete the survey, after which the responses were collected, checked for completeness, and organized for statistical analysis.

Data Analysis

The collected data were analyzed using descriptive statistical methods, including simple rate, weighted mean, and ranking. Likert-scale responses were assigned numerical values and interpreted using descriptive equivalents. These statistical techniques were used to evaluate perceptions of UAS in terms of safety and security, facilities and equipment, and overall acceptance among aviation professionals.

Ethical Considerations

This study adhered strictly to ethical research standards. Participation was voluntary, and all respondents were informed of the study's

objectives, procedures, and their rights as participants. Informed consent was obtained prior to data collection. Participants' identities were kept confidential, and all data were anonymized to protect privacy. The information gathered was used solely for academic and research purposes, ensuring integrity, transparency, and respect for all participants.

Results and Discussion

Safety and Security

Safety is the condition of being protected from harm, danger, or injury, while security is the state of being free from danger or threat. Safety and security are critical aspects of Unmanned Aircraft Systems operations to protect people and property on the ground and ensure the safe integration of Unmanned Aircraft Systems into the national airspace system.

Table 1 presents the perceptions of aviation professionals regarding safety and security.

Table 1. *Safety and Security n=20*

Indicators	*Average Weighted Mean*	*Description*
Unmanned Aircraft Systems, when used in national defense, can increase security by providing surveillance capabilities for anti-terrorism efforts.	4.25	Strongly Agree
Unmanned Aircraft Systems can improve safety and help save lives when used in search and rescue operations.	3.95	Agree
Unmanned Aircraft Systems, when used in law enforcement, can enhance public safety.	3.85	Agree
Unmanned Aircraft Systems technology is increasingly being utilized in the transportation sector to enhance safety and security.	3.65	Agree
Unmanned Aircraft Systems technology can have a positive impact on safety and security in various industries.	3.50	Agree
Average Weighted Mean	3.84	Agree

Legend: 4.21-5.00 = Strongly Agree 3.41-4.20 = Agree 2.61.3.40 = Neutral 1.81-2.60 = Disagree 1.00-1.80 = Strongly Disagree

Facilities and Equipment

According to the Merriam-Webster Dictionary, the definition of facilities is "something (such as a building or large piece of equipment) that is built for a specific purpose. The definition of equipment, as per the same source, is "the set of articles or physical resources serving to equip a person or thing: such as tools or machinery used for a particular purpose." Facilities and equipment are essential for supporting Unmanned Aircraft Systems' operations, providing the necessary physical infrastructure and resources for storage, maintenance, and operations.

Table 2 presents the perceptions of aviation professionals regarding facilities and equipment.

Table 2. *Facilities and Equipment n=20*

Indicators	*Average Weighted Mean*	*Description*
Unmanned Aircraft Systems facilities and equipment are often more compact and lightweight compared to conventional aviation equipment.	4.00	Strongly Agree
Unmanned Aircraft Systems facilities and equipment are more convenient and cost-effective as they can operate from a wider range of locations.	3.80	Agree
Unmanned Aircraft Systems facilities and equipment can be operated remotely, which can reduce the risk of injury to pilots and crew.	3.80	Agree
Unmanned Aircraft Systems facilities and equipment may become fully autonomous, which can contribute greatly to the safety, efficiency, and productivity of the aviation industry.	3.40	Agree
Unmanned Aircraft Systems facilities and equipment are ideal for third-world countries like the Philippines, as Unmanned Aircraft Systems don't have the need for large infrastructure like airports and control towers.	3.40	Agree
Average Weighted Mean	3.69	Agree

Legend: 4.21-5.00 = Strongly Agree 3.41-4.20 = Agree 2.61.3.40 = Neutral 1.81-2.60 = Disagree 1.00-1.80 = Strongly Disagree

Perceptions

According to Merriam-Webster, perception is "awareness of the elements of the environment through physical sensation." In connection to the study, this refers to aviation professionals' attitudes, beliefs, and opinions about various aspects of the aviation industry, such as safety, regulations, technology, and the future of aviation.

Table 3 presents aviation professionals' perceptions of Unmanned Aircraft Systems.

Table 3. *Perceptions n=20*

Indicators	*Average Weighted Mean*	*Description*
You perceive Unmanned Aircraft Systems as a revolutionary technology that has	4.00	Strongly Agree

the potential to transform the aviation industry in the coming years.		
You perceive Unmanned Aircraft Systems as a promising technology that is applicable in the Philippines	3.90	Agree
You acknowledge the potential cost savings of using Unmanned Aircraft Systems, but also recognize the need to balance them with potential impacts on labor and employment.	3.85	Agree
You support the integration of Unmanned Aircraft Systems into some aspects of the aviation industry, like agricultural operations and cargo transportation.	3.80	Agree
You agree with the statement: "Unmanned Aircraft Systems will replace most jobs in the aviation industry but will also create new, better jobs that will require more knowledge and expertise.".	3.75	Agree
Average Weighted Mean	3.86	Agree

Legend: 4.21-5.00 = Strongly Agree 3.41-4.20 = Agree 2.61.3.40 = Neutral 1.81-2.60 = Disagree 1.00-1.80 = Strongly Disagree

Problems Encountered

The problems encountered in the adoption of unmanned aircraft systems include concerns over cybersecurity, job loss, integration with existing infrastructure, lack of information on regulations, equipment costs, limited awareness and training, and issues with insurance and maintenance personnel.

Table 4 contains the following problems encountered in the Perceptions of Aviation Professionals Towards Unmanned Aircraft Systems.

Table 4. *Problems Encountered (Multiple Responses)*

Indicators	*Frequency*	*Rank*
Vulnerability to cyber attacks may raise concerns about the safety of Unmanned Aircraft Systems	18	1.0
Fear of job loss among Aviation Professionals due to the adoption of Unmanned Aircraft Systems	15	2.5
Perceived difficulty in integrating Unmanned Aircraft Systems technology with existing Aviation Infrastructure	15	2.5
Lack of information on Unmanned Aircraft Systems regulations from the Civil Aviation Authority of the Philippines which can create safety and security challenges	12	4.0
Limited availability and accessibility for some users due to the high equipment costs of Unmanned Aircraft Systems.	9	5.5
Lack of awareness among aviation professionals regarding the potential benefits of Unmanned Aircraft Systems technology.	9	5.5
Limited number of training facilities available for Unmanned Aircraft Systems.	8	7.5
Belief that Unmanned Aircraft Systems technology is only suitable for certain types of operations.	8	7.5
Limited accident insurance options available for Unmanned Aircraft Systems operations.	7	9.0
Limited number of qualified maintenance personnel who could service Unmanned Aircraft Systems equipment.	4	10.0

The ranking of problems encountered in the adoption of unmanned aircraft systems in the aviation industry in the Philippines faces several challenges, the most significant being vulnerability to cyber-attacks, with a frequency of 18.

The second-highest problem is with a frequency of 15. It is the fear of job loss among aviation professionals due to the adoption of Unmanned Aircraft Systems.

The third-highest problem has a frequency of 15. The difficulty lies in integrating Unmanned Aircraft Technology with the existing aviation infrastructure.

The fourth-highest problem has a frequency of 12. It is the lack of information on regulations from the Civil Aviation Authority of the Philippines (CAAP). There is a lack of clear rules and guidelines on the proper use of the technology.

The fifth-highest problem has a frequency of 9. It is the limited availability and accessibility of the technology due to high equipment costs.

Conclusion

The aviation professionals agreed on the Perceptions of Aviation Professionals towards Unmanned Aircraft Systems, specifically on safety and security, facilities and equipment, and perceptions.

Based on the issues encountered in the research, the following recommendations can be made for the adoption and safe introduction of Unmanned Aircraft Systems.

Vulnerability to cyber-attacks may raise concerns about the safety of Unmanned Aircraft Systems. Unmanned Aircraft Systems manufacturers and operators should prioritize cybersecurity measures to prevent vulnerability to cyberattacks. Fear of job loss among aviation professionals due to the adoption of Unmanned Aircraft Systems. Unmanned Aircraft Systems Experts should engage with aviation professionals to address concerns about job loss and provide opportunities for training and re-skilling. Perceived difficulty in

integrating Unmanned Aircraft Systems technology with existing aviation infrastructure. Collaboration and consultation with engineers to explore the integration of Unmanned Aircraft Systems technology. Lack of information on Unmanned Aircraft Systems regulations from the Civil Aviation Authority of the Philippines (CAAP), which can create safety and security challenges. The Civil Aviation Authority of the Philippines (CAAP) must provide adequate information on Unmanned Aircraft Systems to ensure safety and security. Limited availability and accessibility for some users due to the high equipment costs of Unmanned Aircraft Systems. Efforts should be made to persuade the manufacturers and suppliers to increase accessibility and affordability of Unmanned Aircraft Systems equipment.

References

Alharbi, B., Khan, S., & Bashir, A. K. (2021). A systematic review of unmanned aerial vehicles applications. Journal of King Saud University-Computer and Information Sciences, 33(2), 200-211. doi: 10.1016/j.jksuci.2020.09.005

Bandura, A. (1986). Social foundations of thought and action: A social cognitive theory. Prentice-Hall.

Bertalanffy, L. von. (1968). General System Theory. Braziller.

Choi, Y., & Jo, W. (2016). Determinants of the public acceptance of drones. Technology in Society, 47, 42-50.

Federal Aviation Administration. (2016). UAS Sightings Report. Retrieved from https://www.faa.gov/uas/resources/publications/media/UAS_Sightings_Report.pdf

Fu, M. C., Chen, C. C., & Lu, H. Y. (2016). Exploring the relationships among safety culture, safety climate and safety self-efficacy of aviation maintenance technicians in Taiwan. Safety science, 85, 171-179.

Heinrich, H. W. (1931). Industrial Accident Prevention: A Scientific Approach. McGraw-Hill. Heiskanen, J., & Pellikka, J. (2018). The Potential of Unmanned Aerial Systems for

Environmental Monitoring. Remote Sensing, 10(8), 1166.

International Civil Aviation Organization. (2011). Unmanned Aircraft Systems. Circular 328. James, D., Cribbin, T., & Coopersmith, J. (2018). Public Perceptions of Drones in the UK:

Results of a National Survey and Factor Analysis. Journal of Unmanned Vehicle Systems.

McNeal, G. (2014). Drones and Aerial Surveillance: Considerations for Legislatures. Journal of National Security Law & Policy, 7(2), 373-400.

Ricci, M. (2018). The European Regulatory Framework for Unmanned Aircraft Systems: Challenges and Opportunities. Air and Space Law, 43(1), 39-53.

Stipanovic, I., Cerovac, Z., & Kovacic, M. (2017). Impact of the regulatory framework on unmanned aerial vehicle acceptance: A case study of the Republic of Croatia. Journal of Air Transport Management, 60, 1-9.

Wang, Q., Chen, X., Wang, Q., & Wang, J. (2021). Regulatory aspects of unmanned aerial vehicles in China: Analysis, challenges and solutions. Journal of Air Transport Management, 92, 101925. doi: 10.1016/j.jairtraman.2020.101