World Journal of Advanced Research and Reviews
eISSN: 2581-9615 CODEN (USA): WJARAI
Cross Ref DOI: 10.30574/wjarr
Journal homepage: https://wjarr.com/

(Research Article)

A comparative analysis of UAS governance in Ecuador and the United States

Kevin Torres-Garrido [1,*] and Mayra Rodriguez-Gonzalez [2]

[1] *Independent researcher (formerly associated with the Secretariat of Higher Education, Science, Technology, and Innovation), Quito, Ecuador.*
[2] *Hartford County Extension Center, College of Agriculture, Health and Natural Resources, University of Connecticut, Farmington, Connecticut, United States of America.*

World Journal of Advanced Research and Reviews, 2026, 30(01), 2385-2394

Publication history: Received on 15 March 2026; revised on 22 April 2026; accepted on 24 April 2026

Article DOI: https://doi.org/10.30574/wjarr.2026.30.1.1105

Abstract

This study examines structural and technological differences between the Unmanned Aircraft Systems (UAS) regulatory frameworks of the United States (U.S.) and Ecuador, with the aim of identifying considerations for airspace governance development in Ecuador. A mixed-methods comparative approach is used, positioning the U.S. Federal Aviation Administration system as a digitally integrated reference case and Ecuador's General Directorate of Civil Aviation framework as a predominantly manual system. Quantitative U.S. aviation safety data are integrated with a qualitative analysis of Ecuador's Directorate of Civil Aviation technical regulations (RDAC 101), along with publicly reported UAS-related incidents in Ecuador. This combined approach addresses limitations stemming from the absence of standardized, publicly available incident datasets in Ecuador. The analysis identifies differences in the availability and structure of digital tools supporting UAS operations, including systems such as LAANC, Remote ID, and the TRUST recreational knowledge test in the U.S., compared to more paper-based and administratively driven processes in Ecuador. In the Ecuadorian context, documented incidents are primarily available through secondary sources such as media reporting. The study compares these two national regulatory environments to highlight differences in data accessibility, operator requirements, and system integration. It contributes a structured comparison of two differing governance models and situates Ecuador's current framework within broader discussions on digitalization and unmanned airspace management.

Keywords: Drones; Unmanned; Ecuador; United States; Regulations; Airspace; Aviation Safety

1. Introduction

Ecuador's current remotely piloted or unmanned aircraft systems (UAS) regulatory framework operates within a context that differs structurally from more digitally integrated international models, such as that of the United States (U.S.) Federal Aviation Administration (FAA) [1]. While global aviation governance trends increasingly incorporate automated airspace management tools and technology [2], Ecuador's General Directorate of Civil Aviation (DGAC) continues to rely primarily on analog processes for UAS oversight. Within this structure, operators are responsible for navigating compliance through static aeronautical information and administrative procedures.

In contrast, the U.S. system incorporates digital infrastructure such as the Low Altitude Authorization and Notification Capability (LAANC), which supports near real-time airspace authorization, and Remote ID, which enables standardized identification and tracking of UAS [3]. Ecuador does not currently operate a comparable centralized digital platform or mandate equivalent real-time identification systems, resulting in differences in how airspace information is accessed and managed by operators [4].

* Corresponding author: Kevin Torres-Garrido

These structural differences may contribute to varying user experiences in terms of accessibility to airspace information and compliance processes. In systems without integrated unmanned traffic management (UTM) tools, pilots may rely on static aeronautical charts and third-party applications that are not directly connected to national regulatory databases [5]. This can limit the degree of real-time situational awareness available to operators and regulators alike.

Additionally, Ecuador does not currently require a standardized entry-level certification for recreational drone users comparable to the FAA's Recreational UAS Safety Test (TRUST). As a result, recreational operations are governed primarily through registration and equipment-based requirements rather than a unified baseline knowledge assessment [6]. The distinction between recreational and commercial use is defined in regulation; however, awareness of these distinctions among users may vary [1, 7].

This study examines these structural differences through a comparative framework, focusing on how variations in digital infrastructure and educational requirements relate to regulatory design and operational context. Our research is guided by the question of how the incorporation of simplified digital tools for authorization and basic operator education, conceptualized through comparison with FAA systems, may inform discussions on regulatory development in Ecuador. We employ a mixed-method approach to compare regulatory structures and incident data between Ecuador and the U.S., with the objective of identifying patterns relevant to airspace management in differing technological environments.

2. Materials and Methods

2.1. Study Area

The primary study area for this research is the sovereign airspace of Ecuador, a geographically diverse territory that includes the Andes Mountains, the Amazon Basin, the Pacific Coast, and the Galápagos Islands. These regions present varying operational conditions and constraints for UAS [8]. Particular attention is given to major urban centers such as Quito and Guayaquil, where airspace complexity is heightened by the proximity of international airports, dense population areas, and correctional facilities [9].

For comparative purposes, the study also considers the U.S. National Airspace System as a reference case. Managed by the FAA, it represents a highly structured and digitally integrated regulatory environment [3]. The system incorporates tools such as LAANC for airspace authorization and Remote ID for aircraft identification and traceability, alongside standardized operational categories for recreational and commercial users (e.g., TRUST and Part 107). This comparison provides a structured baseline for examining differences in regulatory infrastructure and airspace management approaches.

2.2. Methodology

This study employs a mixed-methods comparative analysis to examine structural and technological differences between UAS regulatory environments in Ecuador (DGAC) and the U.S. (FAA). As a desk-based assessment, it combines qualitative policy review with quantitative safety data to explore how differences in regulatory infrastructure relate to operational outcomes.

The U.S. is used as a reference case representing a digitally integrated regulatory system, while Ecuador represents a primarily analog system. Quantitative analysis of the U.S. context includes a time-series review of UAS incident data before and after the implementation of LAANC and TRUST (which occurred between 2017 and 2021), using this period as a benchmark for assessing system evolution.

U.S. data were drawn from two primary sources: the National Transportation Safety Board (NTSB), which covers all serious accidents investigated by this agency, and the National Aeronautics and Space Administration's (NASA) Aviation Safety Reporting System (ASRS), which captures voluntary reports of lower-severity incidents [10, 11]. FAA public sighting reports near airports [12] were excluded due to their high frequency and because they do not necessarily represent verified safety incidents or operational failures.

For Ecuador, no publicly available standardized UAS incident database was identified through DGAC digital repositories [13]. As a result, no quantitative Ecuadorian incident dataset was used. To address this gap, Ecuador's UAS operational context was reconstructed using secondary sources, including media reports and communications on high-impact incidents (e.g., prison security breaches and infrastructure incursions). These qualitative findings were then used in a policy benchmarking comparison of Ecuador's civil aviation regulations against the U.S. regulatory framework.

3. Results and Discussion

3.1. Key Findings

The analysis of UAS operations in Ecuador indicates a discrepancy between observable drone activity and its representation in official civil aviation records. While drone presence is evidenced through documented high-impact incidents, these events are not reflected in centralized regulatory databases that are open to the public. Secondary sources, including media reports, identify multiple security breaches and operational incidents. Table 1 summarizes selected events, including the Machala prison drone incident. These cases document instances of unauthorized drone activity and operational failures.

Table 1 Examples of recent major drone incidents in Ecuador, as covered by the media.

Type	Site	Description	Outcome	Media Sample
National Security / Prison Attack	La Roca Prison (Guayaquil, Ecuador)	A drone carrying explosives was intercepted on the roof of a maximum-security facility.	Controlled detonation by police; prevented potential escape or assassination.	[14]
National Security / Prison Attack	Machala Prison (Machala, Ecuador)	An explosive-laden drone detonated meters from the prison walls as a diversionary tactic.	Resulting fire and chaos led to inmate fatalities.	[15]
Geopolitical / Maritime Conflict	Eastern Pacific	Ecuadorian fishing vessels reported being struck by drones.	Sparked national debate on sovereignty and maritime safety.	[16, 17]
Aviation Safety / Airspace Incursion	Various	Unauthorized UAS sightings near airports.	Resulted in heightened military surveillance of approach paths.	[18, 19]
Environmental Protection	Galapagos Islands	Tourists illegally flying recreational drones in protected areas.	Classified as environmental crimes; leads to fines and equipment confiscation. Drones still allowed for research.	[20, 21]
Criminal Activity / Surveillance	Urban Center (Quito, Ecuador)	Use of drones by organized crime to monitor residential perimeters.	Calls for stricter privacy enforcement and local ordinances against unauthorized surveillance.	[22, 23]
Contraband Smuggling	Various	Persistent silent flights dropping drugs, firearms, and mobile devices into prisons.	Demonstrates the failure of current traceability measures.	[24]

Ecuador's unmanned aircraft governance framework (Table 2) is administered through a formal regulatory structure under the DGAC, known as RDAC 101. The DGAC requires registration and visible QR coding for drones exceeding 250 grams. The system includes updated regulatory provisions introduced in 2025 addressing security and privacy. However, operational procedures for authorization and compliance remain largely manual, and no centralized digital platform for real-time airspace coordination is currently in place. Registration processes rely on operator-managed documentation, including manual transfer of ownership in cases of resale.

Table 2 Main regulations and policies for drones in Ecuador.

Regulation Number	Title/Subject	Key Description & Requirements
RDAC Part 101.185	Unmanned Aircraft Systems (UAS)	The foundational regulation for all drone operations. It establishes the weight categories, flight limits (400ft AGL), and the requirement to maintain Visual Line of Sight (VLOS) at all times.
RDAC Part 101.105	Mandatory UAS Registration	Requires all drones weighing between 250 grams and 250 kilograms to be registered in the DGAC digital database. It mandates the placement of a visible QR Code on the aircraft's frame.
DGAC-2024-010-R	UAS Framework (Includes Privacy and Data Protection)	DGAC-2024-010-R approves the RDAC 101 framework for drone operations in Ecuador, where privacy-related restrictions are also addressed through operational aviation rules and complemented by national data protection law.
RDAC Part 101.195	Airport Buffer Zones	Defines the strict no-fly zones around aerodromes. Drones are prohibited from flying within a 5-kilometer radius of airport approach and departure paths unless specifically authorized by Air Traffic Control.
RDAC Chapters B, D and E, and Appendix 3	Commercial Certification and Related Requirements	Outlines the requirements for commercial operators. This includes the necessity of a civil liability insurance policy and a more rigorous technical certification of the aircraft itself as well as of the operator (the latter includes completing a course under a certified instruction center and passing a knowledge test).
RDAC PART 101.190	Sensitive Area Restrictions	Establishes total flight bans or geofencing requirements for sensitive national security zones, specifically prisons, military bases, and government palaces.
RDAC 101 Appendix 3	Insurance Mandates	Specifies the minimum coverage for third-party liability insurance. For drones in the commercial category, insurance coverage is determined by the aircraft's maximum takeoff weight (MTOW). Policies must provide a minimum coverage of $3,000 USD for drones up to 5 kg, scaling up to $15,000 USD for those exceeding 50 kg.
Galapagos National Park Environmental Policy MAE-PNG/DIR-2026-0006-RM	Galapagos Special Regime	A strict environmental regulation that imposes a total ban on recreational drone use within the Galapagos National Park to protect endemic wildlife, allowing only scientific or professional use under special permits.

When compared with the U.S. FAA regulatory framework (Tables 3 and 4), key structural differences are observed. The U.S. system incorporates digital platforms such as LAANC for airspace authorization and Remote ID for drone identification and tracking. It also includes a standardized recreational pilot knowledge requirement through the TRUST program and passing the Part 107 knowledge exam for commercial operators. In contrast, Ecuador's system is primarily based on manual authorization procedures and does not include a standardized national-level entry certification for recreational drone operators but does include thorough course requirements and knowledge testing for commercial operators.

Table 3 Main regulations and policies for drones in the U.S.

Regulation Number	Title/Subject	Key Description & Requirements
14 CFR Part 107	Small UAS Rule (Commercial)	The standard regulation for all non-recreational drone operations under 55 lbs. It requires a Remote Pilot Certificate, 24-month recurrency, and specific rules for flying at night or over people.
49 U.S.C. § 44809	The Exception for Limited Recreational Operations	Legal carve-out for hobbyists. It mandates passing the TRUST test, following a Community-Based Organization (CBO) safety code, and flying purely for personal enjoyment.
14 CFR Part 89	Remote Identification (Remote ID)	Digital license plate law. As of 2026, virtually all drones in flight must broadcast their identity, altitude, and location via radio frequency to ensure traceability.
14 CFR Part 48	Registration Requirements	Mandates that all drones weighing more than 250 grams must be registered via the FAA DroneZone. Commercial drones must be registered individually, while recreational users register themselves as a pilot.
14 CFR Part 89 (Subparts B and C)	FAA-Recognized Identification Areas (FRIA)	Specific locations (usually flying clubs) where drones without Remote ID hardware are legally allowed to operate within defined boundaries.
14 CFR Part 135	Air Carrier Certification	Required for drone delivery and high-complexity long-distance logistics (e.g., Amazon, Zipline). It treats drone companies similarly to small airlines with strict maintenance and safety manuals.
14 CFR Part 108 (proposed for 2026)	Beyond Visual Line of Sight (BVLOS)	A new framework that allows for routine commercial flights beyond the pilot's sight without needing individual waivers, provided the drone meets high-tier safety standards.
14 CFR Part 157	Notice of Construction/Alteration	Used to coordinate drone ports (vertiports) and permanent launch sites, ensuring they do not interfere with traditional airport approach paths.
49 U.S.C. § 44103	Registration and Recordation	The broader legal statute that gives the FAA authority to maintain a central registry of all civil aircraft, including unmanned systems.

Table 4 A comparison of regulations for drones, Ecuador vs. the U.S.

Feature	Ecuador (DGAC - RDAC 101)	United States (FAA - Part 107/44809)	Comparative Summary
Governance Model	Passive/Analog: Relying on manual workflows and authorizations, and static PDF charts.	Proactive/Digital: Real-time data integration, automated authorizations, and digital tracking.	The U.S. is digital-first, while Ecuador maintains a traditional bureaucratic framework.
Recreational Entry	No Exam Requirement: Anyone can fly for hobbyist purposes without a safety test.	Mandatory TRUST: All recreational pilots must pass a safety test before flying.	The U.S. ensures a safety floor of knowledge; Ecuador lacks an educational filter for hobbyists.
Registration	QR Code Only: Drones >250g must be registered; relies on a physical sticker.	FAA DroneZone + Digital: Drones >250g registered digitally ($5 fee) with an online database.	Both require registration for similar weights, but the U.S. database is more integrated and accessible.

Airspace Access	Manual/Analog: Pilots must consult static maps; authorizations take days/weeks via official means.	LAANC (Automated): Near-instant authorization via mobile apps for controlled airspace.	The U.S. system (LAANC) provides situational awareness in seconds; Ecuador's process is arduous.
Traceability	Physical Verification: Authority must intercept the drone to verify the operator.	Remote ID (Digital): Drones broadcast ID and location in real-time for security oversight.	The U.S. uses digital license plates for real-time monitoring; Ecuador lacks digital traceability.
Maximum Altitude	400 ft (122 m): Standard limit above ground level.	400 ft (122 m): Standard limit, with exceptions for commercial work near structures.	Harmonized at 122 meters, following international International Civil Aviation Organization (ICAO) standards.
Visual Line of Sight	VLOS Mandatory: No autonomous flight allowed without pilot intervention.	VLOS + BVLOS Path: VLOS is standard; Part 108 (proposed for 2026) enables routine Beyond Visual Line of Sight.	Both prioritize VLOS, but the U.S. is actively scaling BVLOS for deliveries and infrastructure.
Incident Reporting	Limited/Invisible: No public database; incidents often go unreported unless catastrophic.	ASRS & NTSB: Robust, transparent databases that track safety trends and technical failures.	The U.S. has a data-rich environment for risk management; Ecuador suffers from statistical invisibility.

Analysis of U.S. aviation safety databases, including ASRS (190) and NTSB (60) records, provides aggregated information on reported UAS-related incidents. A large number of reported incidents and system usage (Figure 1) were still observed over the period following the implementation of LAANC and TRUST (2017 to the early 2020s). However, this trend may reflect increased system adoption and reporting activity rather than a change in underlying safety conditions. ASRS records were only available for analysis through 2020; therefore, trends beyond this point can only be assessed using NTSB data, which show a consistent increase in reported cases for completed years. Overall, a proportional comparison indicates approximately three to four self-reported ASRS cases for every one NTSB-recorded serious incident. While procedural deviations and human factors-related airspace events represent a significant portion of the ASRS dataset (Figure 2), these reports conclude with the initial anomaly without documenting subsequent outcomes (Figure 3). Documented UAS events in the NTSB database generally stem from technical issues (Figure 2) and often meet the criteria for substantial damage (Figure 3).

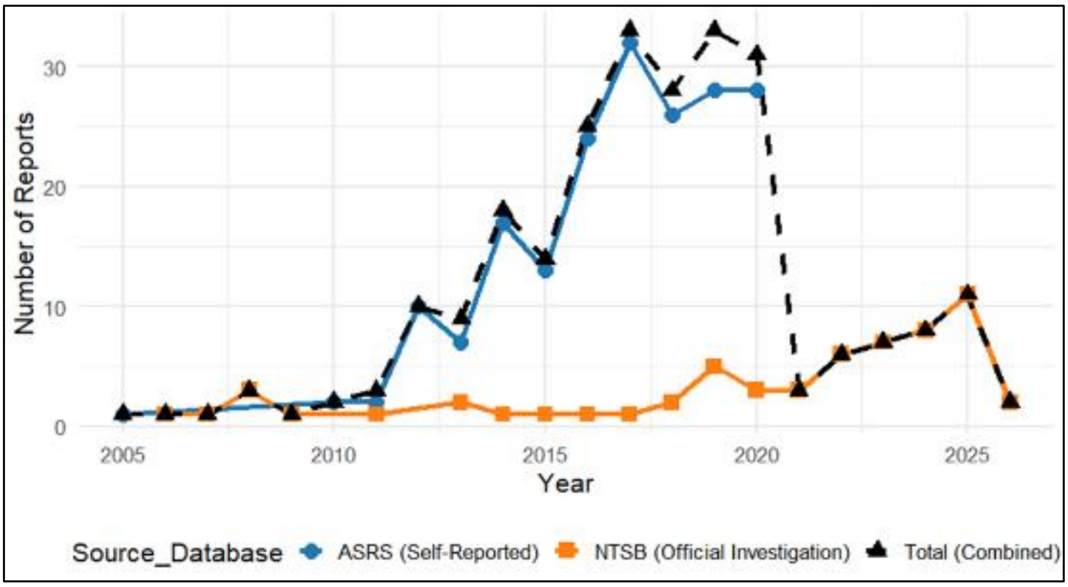

Figure 1 Annual UAS safety reports for the U.S., a trend analysis from 2005 to 2025

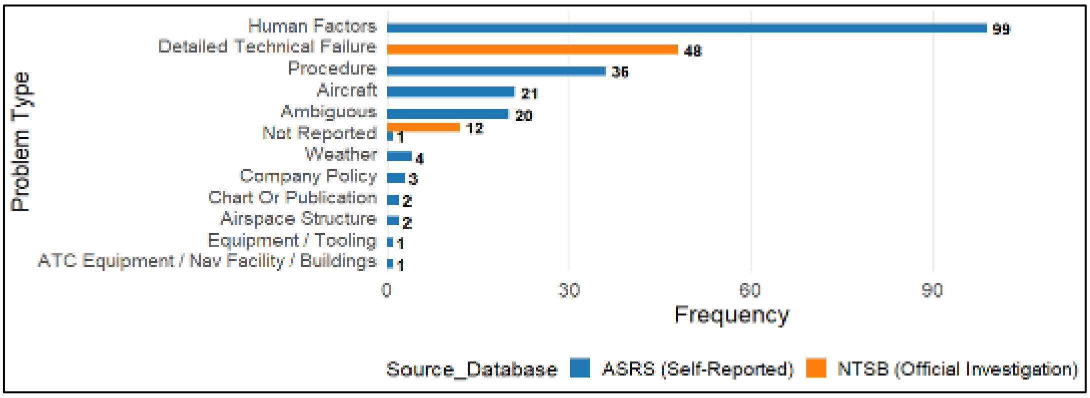

Figure 2 UAS problem types for the U.S., by database.

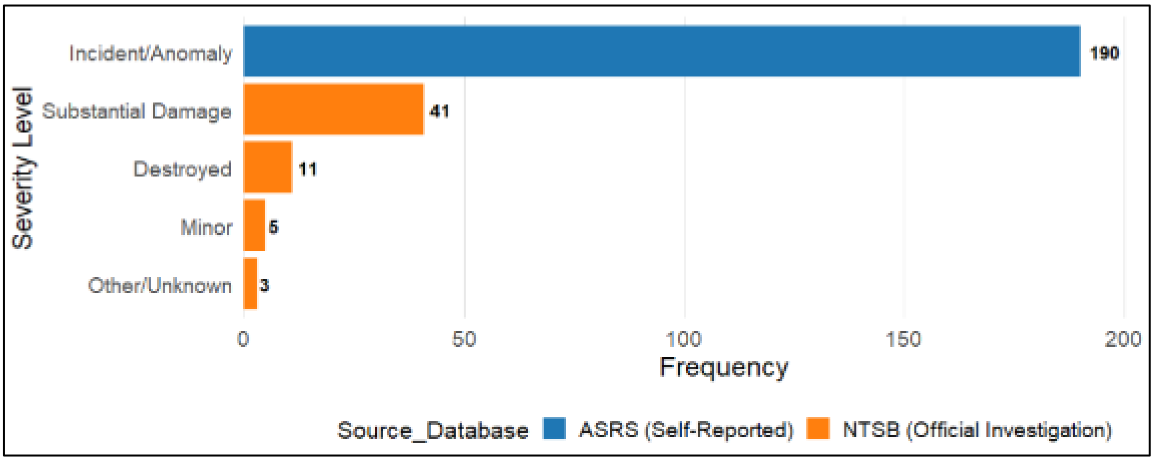

Figure 3 Severity levels of UAS incidents for the U.S., by database.

3.2. Implications and Recommendations

As UAS become increasingly accessible in Ecuador through retail channels, the regulatory and technical frameworks required to manage them may need to evolve alongside this growth; however, they remain largely anchored in analog processes [1]. While the DGAC requires registration and visible identification for aircraft exceeding 250 grams, the absence of a more integrated digital ecosystem may limit the visibility and accessibility of compliance mechanisms. In this context, barriers to compliance could stem not only from pilot intent, but also from educational and administrative challenges [25, 26]. Drawing on U.S. FAA data as a comparative reference point, this section highlights potential areas for consideration in the ongoing development of Ecuador's airspace management.

3.2.1. Addressing the educational vacuum and the human factor

Data from the U.S. ASRS indicates that human factors contribute to a substantial portion of reported safety incidents, even within a relatively mature regulatory environment. While these findings are not directly transferable, they suggest that baseline educational requirements may play an important role in supporting safe operations. In Ecuador, where no equivalent entry-level exam currently exists for recreational users, this comparison points to a possible gap worth further exploration. Introducing accessible educational tools or requirements could help support a transition from intuition-based to more standardized operational practices, although their effectiveness would depend on local implementation and uptake [25, 26].

3.2.2. From analog processes to digital situational awareness

This analysis also points to differences in how pilots access airspace information. In the U.S., tools such as LAANC provide near real-time situational awareness and authorization, whereas Ecuadorian operators may rely more heavily on static aeronautical charts. While it is difficult to quantify the direct impact of this difference, prior U.S. incident data suggests that situational awareness challenges can contribute to airspace incursions. Expanding access to dynamic, user-friendly airspace information, potentially through open-data approaches, could be one avenue for improving awareness, though such transitions would require careful consideration of technical capacity and governance [27].

3.2.3. Data-informed risk management and traceability

The limited availability of standardized UAS incident data in Ecuador may also constrain the ability to assess risks systematically. In contrast, U.S. systems allow for differentiation between technical issues and operational or human factors. While not prescriptive, this comparison suggests that strengthening data collection and traceability mechanisms could support more informed decision-making over time. Enhancements to existing registration systems, along with potential future exploration of identification technologies, may offer pathways toward greater transparency, though these would need to be adapted to local regulatory and market conditions [1].

3.2.4. Reconsidering the professional threshold

Finally, this study raises questions about how regulatory structures shape operator behavior. If pathways to professional certification are perceived as complex or inaccessible (especially due to the added expectation of coursework completion in Ecuador and the cost of insurance), there is a possibility that some activities may occur outside formal frameworks. Drawing from the U.S. example, streamlining certification processes could be one approach to encouraging formal participation for different groups [28], although further research would be needed to understand how such changes might function in Ecuador's specific institutional context.

4. Conclusion

The comparative analysis of the aeronautical frameworks in Ecuador and the U.S. suggests that a central consideration for improving aviation safety in Ecuador beyond regulatory intent would be enhancing technological infrastructure and user education. In the U.S., the integration of automated systems such as LAANC and traceability tools like Remote ID has enabled a high-volume, low-risk operating environment. By contrast, Ecuador's reliance on manual processes could inadvertently create conditions in which compliance is more difficult than non-compliance. Addressing these gaps will be critical to reducing unintentional violations and strengthening overall airspace safety as drone use in Ecuador continues to expand.

Compliance with ethical standards

Disclosure of conflict of interest

The authors declare no conflict of interest.

References

[1] Albán Ruiz PF, Montoya Lara LH, de Jesús Pereira AM. Standardization of policies of the use of distance aircraft systems and aircraft systems (RPAS/UAS) in Ecuador. In: World Conference on Information Systems and Technologies. Cham: Springer International Publishing; 2017. p. 596–602. Available from: [https://doi.org/10.1007/978-3-319-56541-5_61]

[2] Wanner D, Hashim HA, Srivastava S, Steinhauer A. UAV avionics safety, certification, accidents, redundancy, integrity, and reliability: a comprehensive review and future trends. Drone Syst Appl. 2024;12:1–23. Available from: [https://doi.org/10.1139/dsa-2023-0091]

[3] Sun J, Hubbard S. An examination of UAS incidents: characteristics and safety considerations. Drones. 2025;9(2):112. Available from: [https://doi.org/10.3390/drones9020112]

[4] Satama Rivilla LM, Lara Guijarro EG. Drones: oportunidades y desafíos en usos civiles. Investig Tecnol IST Cent Técnico. 2025;7(1):100–113. Available from: [https://investigacionistct.ec/ojs/index.php/investigacion_tecnologica/article/view/187]

[5] Grubesic TH, Nelson JR. A primer on aeronautical charts and maps. In: UAVs and urban spatial analysis: an introduction. Cham: Springer International Publishing; 2020. p. 31–50. Available from: [https://doi.org/10.1007/978-3-030-35865-5_3]

[6] Gutiérrez-Proenza J, Quishpe-Lugmaña KS, Tipantuña-Tenelema SF. Drones en el Ecuador: aproximación a una regulación jurídica ineludible. Rev Jurídica Crítica Derecho. 2022;3(4):68–79. Available from: [https://doi.org/10.29166/cyd.v3i4.3536]

[7] Albán Ruiz PF. Normalización de políticas de uso de vehículos aéreos multirotores de micro escala para uso militar en áreas de emergencias y desastres naturales en Ecuador [Master's thesis]. Instituto Politécnico de Leiria; 2017. Available from: [https://media.proquest.com/media/hms/PRVW/1/C8wFZ?_s=SWQXtRgLQztxmZy0p8tsq23f%2Fm4%3D#view=FitV]

[8] Yumbla Verdugo JA, Chabla Mocha JB. Análisis comparativo entre levantamientos topográficos con estación total y vehículos aéreos no tripulados (UAVs) en los Andes del sur del Ecuador [Bachelor's thesis]. 2024. Available from: [http://dspace.ups.edu.ec/handle/123456789/28270]

[9] Cabezas-Freire CR, Guashpa MHC, Reyes CDA, Guevara CCL. El desafío existencial del Estado ecuatoriano: fragmentación criminal, narcotráfico y la patología de la cooptación institucional. Ciencia Latina Rev Cient Multidiscip. 2025;9(6):1250–1274. Available from: [https://doi.org/10.37811/cl_rcm.v9i6.21111]

[10] National Aeronautics and Space Administration (NASA). Aviation Safety Reporting System (ASRS) [Internet]. [cited 2026 Apr 23]. Available from: [https://asrs.arc.nasa.gov/]

[11] National Transportation Safety Board (NTSB). CAROL [Internet]. [cited 2026 Apr 23]. Available from: [https://carol.ntsb.gov/]

[12] Federal Aviation Administration (FAA). Drone sightings near airports [Internet]. 2026 [cited 2026 Apr 23]. Available from: [https://www.faa.gov/uas/resources/public_records/uas_sightings_report]

[13] Dirección General de Aviación Civil (DGAC). Junta investigadora de accidentes [Internet]. [cited 2026 Apr 23]. Available from: [https://apps.aviacioncivil.gob.ec/jia/default.aspx]

[14] Deutsche Welle. Un dron estalla sobre cárcel de máxima seguridad de Ecuador [Internet]. 2024 [cited 2026 Apr 23]. Available from: [https://www.dw.com/es/un-dron-estalla-sobre-c%C3%A1rcel-de-m%C3%A1xima-seguridad-de-ecuador/a-70148337]

[15] Ecuavisa. Dron que sobrevolaba la cárcel fue detonado en Machala, no hubo heridos [Video]. YouTube [Internet]. 2025 [cited 2026 Apr 23]. Available from: [https://www.youtube.com/watch?v=fJkvniYiQV8]

[16] El Universo. Ya no es solo el Don Maca: pescadores de otro barco de Manta denuncian ataque con drones en altamar [Internet]. 2026 [cited 2026 Apr 23]. Available from: [https://www.eluniverso.com/noticias/ecuador/denuncian-ataque-con-drones-a-barco-de-manta-y-presunto-abuso-militar-en-altamar-nota/]

[17] Radio Francia Internacional. Pescadores ecuatorianos denuncian que su barco fue bombardeado por drones [Internet]. 2026 [cited 2026 Apr 23]. Available from: [https://www.rfi.fr/es/m%C3%A1s-noticias/20260408-pescadores-ecuatorianos-denuncian-que-su-barco-fue-bombardeado-por-drones]

[18] Associated Press. Ecuador aprueba reglamento para uso de drones [Internet]. 2020 [cited 2026 Apr 23]. Available from: [https://apnews.com/article/noticias-4410dcd4a150bce8739bfe6ea1a1a8f1]

[19] El Diario. Nuevo reglamento permite controlar drones y combatir actividades ilícitas [Internet]. 2025 [cited 2026 Apr 23]. Available from: [https://www.eldiario.ec/ecuador/nuevo-reglamento-permite-controlar-drones-y-combatir-actividades-ilicitas-09072025/]

[20] BBC. Drones help Galapagos tackle rat infestation [Internet]. 2019 [cited 2026 Apr 23]. Available from: [https://www.bbc.com/news/technology-47071513]

[21] LEXIS. Registro oficial del día: Galápagos establece nueva normativa para el uso de drones en áreas naturales protegidas [Internet]. 2026 [cited 2026 Apr 23]. Available from: [https://www.lexis.com.ec//noticias/registro-oficial-del-dia-galapagos-establece-nueva-normativa-para-el-uso-de-drones-en-areas-naturales-protegidas]

[22] La República. Drones que sobrevuelan conjuntos residenciales podrían ser usados por delincuentes [Internet]. 2023 [cited 2026 Apr 23]. Available from: [https://www.larepublica.ec/blog/2023/04/12/drones-que-sobrevuelan-conjuntos-residenciales-podrian-ser-usados-por-delincuentes/]

[23] Primicias. Las bandas criminales dan el salto tecnológico en Ecuador [Internet]. 2026 [cited 2026 Apr 23]. Available from: [https://www.primicias.ec/noticias/en-exclusiva/bandas-criminales-salto-tecnologico-ecuador/]

[24] Infobae. Decomisaron en Ecuador tres drones sofisticados que pretendían ingresar drogas y armas a la cárcel más violenta del país [Internet]. 2023 [cited 2026 Apr 23]. Available from: [https://www.infobae.com/america/america-latina/2023/07/28/decomisaron-en-ecuador-tres-drones-sofisticados-que-pretendian-ingresar-drogas-y-armas-a-la-carcel-mas-violenta-del-pais/]

[25] Schmidt R, Schadow J, Eißfeldt H, Pecena Y. Insights on remote pilot competences and training needs of civil drone pilots. Transp Res Procedia. 2022;66:1–7. Available from: [https://doi.org/10.1016/j.trpro.2022.12.001]

[26] Stöcker C, Bennett R, Nex F, Gerke M, Zevenbergen J. Review of the current state of UAV regulations. Remote Sens. 2017;9(5):459. Available from: [https://doi.org/10.3390/rs9050459]

[27] Hussein M, Nouacer R, Corradi F, Ouhammou Y, Villar E, Tieri C, et al. Key technologies for safe and autonomous drones. Microprocess Microsyst. 2021;87:104348. Available from: [https://www.sciencedirect.com/science/article/pii/S0141933121005056]

[28] Slater TF. In pursuit of FAA Part 107 commercial remote drone pilot certification for students. CTE J. 2024;12(1). Available from: [https://www.thectejournal.com/uploads/1/0/6/8/10686931/volume_12_number_1_summer_2024-complete-issue.pdf]