

# Material Elements of the Crime of Assault on the State's Airspace: A Comparative Study

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## Abstract

This article provides a comprehensive legal analysis of the crime of assault on the state's airspace by examining the material element as articulated in criminal law theory and national legislation. Building on classical definitions of actus reus, the study explores how external physical conduct—such as unauthorized entry, deviation from air routes, low-altitude violations, misuse of transit and innocent passage, aircraft hijacking, and drone or missile incursions—constitutes the observable basis for criminal liability in the aerial domain. The research emphasizes that airspace violations generate both material results, including physical damage and safety hazards, and legal results, such as infringements on sovereignty, disruption of national security, and intelligence exposure. The analysis also details the evidentiary challenges in establishing causation, particularly in cases involving unmanned aerial vehicles, cyber interference, and ballistic missiles, where radar tracking, satellite imagery, and aviation logs play critical roles. A comparative study of Iraqi, Egyptian, and Emirati legislation reveals distinct approaches to defining and criminalizing airspace violations. Iraq provides a clear conceptual definition of the material element but lacks technological updates addressing drones and missiles. Egypt relies on sector-based aviation regulation without a unified doctrinal structure, creating fragmentation and interpretive challenges. The United Arab Emirates offers the most advanced framework, integrating international conventions, detailed domestic provisions, and modern technological controls governing UAVs and cyber threats. The findings demonstrate that modern airspace regulation requires cohesive legislative reform, strong alignment with international standards, and explicit recognition of emerging forms of aerial misconduct. The study concludes by proposing legislative pathways for strengthening national airspace protection in an era of rapidly evolving aerial technologies.

**Keywords:** Airspace sovereignty; actus reus; material element; aviation security.

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## 1. Introduction

The sovereignty of the state over its national airspace has long been recognized as an indispensable component of territorial integrity, forming a central pillar of modern international law. This conception of sovereignty rests on the understanding that control over airspace is as essential as control over land and maritime domains, given that states must retain full authority to regulate, protect, and defend the vertical dimension above their territory. The historical crystallization of this principle gained substantial momentum in the aftermath of World War II, when national borders became increasingly vulnerable to aerial technologies and when the proliferation of civil and military aviation heightened the need for legal certainty in determining the extent of a state's exclusive jurisdiction. The expansion of commercial aviation stimulated the creation of robust international frameworks, but it also underscored the state's prerogative to control every aspect of its airspace for safety, security, and economic purposes. Scholars emphasize that airspace sovereignty is rooted not only in the classical Westphalian understanding of territorial authority, but also in the evolving contextual demands of post-war technological development, which required states to adapt their legal and institutional mechanisms to new forms of aerial mobility (Vodolaskova & Головки, 2023). This evolution reflects how deeply interconnected airspace governance has become with national defense and economic infrastructures.

Over time, airspace has acquired strategic significance far beyond its original military function. With the continuous advancement of aviation technology, aerospace industries, drone systems, satellite navigation, and ballistic missile technologies, airspace today constitutes one of the most sensitive layers of national security. Governments increasingly rely on aerial surveillance, early warning systems, and defense mechanisms to protect vital installations, making airspace a crucial domain for safeguarding sovereignty (Munoz-Cordero, 2025). From an economic perspective, airspace facilitates global trade, tourism, and commercial aviation, creating pathways for economic development that require consistent legal protection and regulatory oversight. At the same time, airspace has become a contested domain in numerous geopolitical conflicts, where states compete for strategic aerial advantage, assert military presence, or carry out intelligence missions, leading to tensions and legal disputes in various regions of the world (Barus, 2021). The Middle East, in particular, has witnessed dramatic escalations in airspace violations due to political instability, the presence of non-state armed groups, and the extensive involvement of foreign military powers.

The modern era has seen a notable rise in the number and complexity of airspace violations. Civil aircraft have at times inadvertently deviated from designated routes, while public and military aircraft have frequently entered foreign airspace without authorization, often triggering diplomatic crises. The increasing use of unmanned aerial vehicles (UAVs) for surveillance, targeted strikes, and intelligence gathering has fundamentally altered the landscape of aerial violations (Sari, 2024). UAV technology allows states and non-state actors to penetrate airspace boundaries with minimal risk, posing unprecedented challenges to traditional notions of sovereignty. Furthermore, the development of intercontinental ballistic missiles, which traverse airspace at high altitudes and extreme velocities, has raised new questions regarding the legal categorization of such intrusions. Scholars note that the strategic deployment of missiles, even when used indirectly as deterrence or signaling tools, constitutes a form of airspace penetration with potentially severe implications for national and regional stability (Cauia & Bria, 2021). As such, legal systems across the world have been compelled to revisit and expand the conceptual framework governing airspace violations.

Despite the centrality of airspace sovereignty to statehood, many national legal systems have not established comprehensive or unified definitions of the material element associated with crimes of airspace assault. This lack of doctrinal clarity becomes particularly evident when comparing the approaches adopted by different Middle Eastern legal systems. In Iraq, for instance, the legislator has provided specific definitions of criminal conduct within the Penal Code, yet questions remain as to whether these definitions adequately encompass the full range of behaviors associated with modern airspace violations (Ali & Saberi, 2020). Egypt, by contrast, does not articulate a general definition of the material element in its penal legislation, instead addressing criminal acts individually through specialized provisions. The United Arab Emirates provides a broader legislative formulation, but debates persist regarding the precision and applicability of such definitions in increasingly complex contexts (Alkatbi & Alkrisheh, 2024). These variations highlight the broader challenge faced by legal systems: the need to harmonize doctrinal concepts with the evolving nature of aviation technologies and transnational threats.

The absence of unified definitions has practical legal consequences, particularly in criminal proceedings where determining the presence of the material element is essential for establishing culpability. Legal theorists emphasize that *actus reus* must consist of a tangible external behavior that produces a legally relevant result, distinguishing it from mere intention or abstract planning (Jonas, 2021). When applied to airspace violations, this requirement necessitates a precise identification of the conduct that constitutes intrusion, whether through unauthorized entry, violation of flight altitudes, deviations from air corridors, or engagement in acts of aerial piracy. Complex cases involving drones, cyber-enabled aircraft interference, or missile trajectories further complicate the definition of what constitutes criminal behavior in this domain. Comparative legal scholarship indicates that material elements in aviation-related crimes often intersect with broader principles of state security, public order, and international law, making it imperative to develop harmonized and context-sensitive legal formulations (Mungan, 2022).

The increase in airspace violations in the Middle East heightens the urgency of this issue. Geopolitical tensions, ongoing armed conflicts, and humanitarian crises have created circumstances in which foreign military aircraft regularly traverse national boundaries without authorization. In Iraq and Syria, for example, state airspace has been repeatedly breached by various actors conducting military operations, reconnaissance missions, or targeted strikes (Kokha, 2021). Similar challenges exist in Egypt and the Arabian Gulf region, where airspace has been exposed to threats from both state and non-state entities pursuing strategic or destabilizing objectives (Al-Tkhayneh, 2024). These developments underscore the need for robust legal frameworks that clearly define the material element of airspace assault and establish mechanisms for accountability.

Given these complexities, the present study addresses a number of critical research questions necessary for understanding and enhancing legal responses to airspace violations. The first question concerns whether the Iraqi legislator has defined the material element of the crime of assault on the state's airspace in a manner that is adequate, comprehensive, and adaptable to modern challenges. Although Iraq's Penal Code provides a general definition of criminal conduct, it remains unclear whether this definition fully captures the nuances of contemporary aerial violations, particularly those involving drones or advanced weaponry. The second question examines whether comparative legal systems—specifically, those of Egypt and the United Arab Emirates—offer more refined or alternative conceptualizations of the material element. Evaluating their legislative approaches allows for the identification of potential gaps or strengths that may help inform Iraqi legal reforms. The third question focuses on whether Iraqi law aligns with or diverges from these comparative frameworks, particularly regarding the scope of prohibited behaviors, the nature of criminal results, and the causal nexus required for establishing liability.

These questions form the core problem of the study, as the lack of clarity in defining the material element can lead to inconsistent judicial applications and hinder the effective prosecution of airspace-related offenses. Comparative legal scholarship further demonstrates that variations in legislative drafting often stem from differences in national priorities, technological capacities, or interpretations of sovereignty (Nahi, 2025). However, such variations become problematic when they impede transnational cooperation or undermine legal predictability in matters as sensitive as airspace control. As modern technologies enable increasingly sophisticated forms of airspace intrusion, the legal distinction between permissible aerial navigation and criminal assault becomes more difficult to delineate (Ibrahim et al., 2025). This difficulty reinforces the importance of developing a coherent analytical framework that can bridge doctrinal gaps across national legislations while remaining faithful to international standards.

In this context, the study aims to expand existing knowledge on the material element of the crime of airspace assault by examining it through both analytical and comparative legal methodologies. The analysis explores how each national legal system conceptualizes the physical act, the resulting harm, and the causal relationship inherent in this category of crime. It further identifies areas where legislative reform may be required to address contemporary challenges in airspace security. Through this examination, the study seeks to highlight the necessity of harmonizing national legal frameworks with international principles while also accounting for the unique security pressures faced by Middle Eastern states.

By clarifying the doctrinal foundations of the material element and situating them within broader regional and technological developments, this introduction lays the groundwork for a comprehensive evaluation of Iraqi, Egyptian, and Emirati legislation. The aim of this study is to analyze the material element of the crime of assault on the state's airspace through a comparative legal approach that provides clarity, coherence, and practical relevance for modern airspace governance.

## 2. Theoretical Framework: Material Elements in Criminal Law

The material element, or *actus reus*, constitutes one of the foundational pillars of criminal liability, representing the external dimension of the crime and distinguishing punishable conduct from internal mental states. In classical and contemporary criminal theory, the material element refers to the tangible behavior through which the offender manifests a prohibited act in the external world, thereby producing a legally recognized harm. Scholars emphasize that *actus reus* consists exclusively of observable physical conduct, because criminal law does not extend its authority to mere thoughts, intentions, or internal dispositions that never materialize into objective behavior (Jonas, 2021). This distinction ensures that criminal punishment remains grounded in verifiable actions rather than subjective mental states, thus preserving legal certainty and preventing arbitrary prosecution. The material element therefore encapsulates the requirement that criminal liability arises only when conduct crosses the threshold from internal contemplation to external manifestation, aligning with the broader principle that criminal law intervenes only when socially harmful behavior becomes perceptible.

The nature of *actus reus* encompasses both positive acts and omissions, provided that the omission represents a failure to perform a duty imposed by law. Positive acts involve the direct commission of conduct that the law prohibits, such as unauthorized entry into restricted airspace or deliberate disruption of aviation routes. Omissions arise when an individual fails to carry out a legally required action, which may occur in specialized contexts where actors hold statutory or professional obligations to act. Jurists note that omissions may be particularly significant in regulatory domains, including aviation safety, where failing to comply with mandatory reporting procedures or required navigational standards can produce dangerous consequences (Ali & Saberi, 2020). In all instances, however, what remains constant is that the material element must be objectively observable. Thoughts, wishes, motives, or preparatory reflections are categorically excluded because they do not possess the materiality necessary to constitute the body of the crime. Comparative criminal law scholarship reinforces that only conduct with tangible externality can satisfy the requirements of *actus reus*, ensuring that criminal liability remains tied to behavior rather than psychology (Mungan, 2022).

To fully appreciate the structure of the material element, it is essential to examine its core components: criminal behavior, criminal result, and the causal link between them. Criminal behavior is the central feature of the material element, representing the concrete action or omission undertaken by the offender. This behavior must be unlawful and must constitute a breach of a legal prohibition. Scholars explain that criminal behavior operates as the cornerstone upon which other elements of liability are built, because without an observable act, no result or causal relationship can exist (Jonas, 2021). The second component, the criminal result, refers to the change produced in the external world as a consequence of the behavior. Such a result may be material, such as damage to an aircraft or breach of air defense systems, or legal, such as an infringement upon the sovereignty and territorial integrity of the state. The third component, causation, forms the indispensable bridge between behavior and result, demonstrating that the prohibited outcome occurred because of the offender's conduct rather than from some independent or intervening cause. Comparative legal studies highlight the need for a rigorous causal analysis in crimes with complex technological dimensions, especially those involving airspace violations or cyber-assisted aerial intrusions (Ibrahim et al., 2025).

The importance of the material element becomes especially pronounced in crimes affecting state security. Airspace violations occupy a unique position within this category because they not only endanger public safety and aviation operations but also strike at the core of national sovereignty. The *actus reus* of an airspace assault involves conduct that intrudes upon the aerial domain of a sovereign state, directly challenging its exclusive authority to regulate, monitor, and defend its airspace (Barus, 2021). Airspace intrusions by civil, military, or unmanned aircraft pose heightened risks due to the speed, altitude, and unpredictability associated with aerial movement, making these violations more difficult to detect and prevent. The emergence of unmanned aerial vehicles and autonomous systems has further complicated these challenges, as these technologies can penetrate national airspace with minimal visibility, low radar detection, and high operational precision (Sari, 2024). In such contexts, identifying the material element requires sophisticated technological evidence, including radar tracking, satellite imaging, or electronic signal detection, to establish the presence of prohibited external conduct.

The *actus reus* in crimes involving airspace violations also has a direct connection to the preservation of sovereignty. Because sovereignty grants states complete and exclusive control over their airspace, even temporary or superficial intrusions

can constitute violations of the state's sovereign prerogatives. Scholars argue that airspace sovereignty is not merely a territorial right but also a protective mechanism that enables states to maintain political independence, national security, and defense integrity (Vodolaskova & Головкин, 2023). Consequently, the material element in airspace-related crimes must be interpreted in light of these broader sovereignty considerations. The intrusion of an unauthorized aircraft, the operation of drones equipped with surveillance devices, or the passage of missiles across national boundaries constitutes external behavior that produces a legally recognized harm: the breach of territorial integrity. This imbues the *actus reus* in such offenses with heightened legal and political significance.

Beyond sovereignty, proving the material element in airspace violations presents unique evidentiary challenges. Because aircraft and aerial devices operate at high altitudes and speeds, direct observation of the prohibited conduct is rarely possible. Instead, states rely on advanced detection systems that can capture the trajectory, altitude, speed, and identifying characteristics of intruding objects. This technological dependence can complicate criminal proceedings, as courts must determine the admissibility, reliability, and interpretive validity of electronic or satellite-based evidence (Munoz-Cordero, 2025). The emergence of stealth technologies, low-altitude drones, and hypersonic weapons has further intensified these challenges, making it increasingly difficult to establish direct causation or clear proof of unlawful entry. Consequently, the evidentiary dimension of *actus reus* in this field requires ongoing refinement in both national legislation and judicial practice.

The international legal context provides additional clarity for understanding the material element in airspace-related crimes. The Chicago Convention of 1944 is considered the cornerstone of international civil aviation law, establishing the principle that every state possesses complete and exclusive sovereignty over the airspace above its territory. This principle forms the legal basis for identifying unauthorized entry as a material act capable of generating liability under national and international law (Cauia & Bria, 2021). The Convention further outlines the conditions under which foreign aircraft may enter or traverse airspace, distinguishing between scheduled and non-scheduled flights and requiring prior authorization for the former. It also obliges states to regulate air navigation in ways that ensure safety, security, and the efficient movement of aircraft.

Within this framework, the concepts of innocent passage and transit passage become essential for evaluating the legality of aerial movement. Innocent passage refers to the ability of aircraft to traverse certain areas of airspace without landing, provided that such passage is not prejudicial to the peace, order, or security of the state. Transit passage, a concept derived from the United Nations Convention on the Law of the Sea, applies by analogy in aviation contexts, especially over international straits where continuous and rapid transit is permitted under strict conditions. Legal scholars highlight that both forms of passage are subject to limitations, particularly when foreign aircraft engage in surveillance, military maneuvering, or other conduct that exceeds the bounds of permissible transit (Kamali, 2019). In such scenarios, the conduct shifts from lawful navigation to criminal intrusion, thereby satisfying the requirements of the material element.

Despite its foundational role, international aviation law contains notable gaps that complicate the application of the material element in modern airspace offenses. Many contemporary threats—such as drone incursions, cyber interference with aircraft systems, and the use of hypersonic missiles—were not contemplated at the time the Chicago Convention and subsequent aviation treaties were drafted. As a result, certain behaviors may fall into ambiguous legal categories where neither treaty law nor customary norms explicitly prohibit or regulate emerging technologies (Ajmal, 2023). This disconnect between evolving technology and static legal frameworks represents a significant challenge for states that must adapt their national laws to address forms of behavior that the international system does not yet fully recognize. Scholars urge the need for updated international agreements that can accommodate advances in unmanned aviation, autonomous flight systems, and long-range weapons to ensure that the material elements of related crimes remain legally coherent (Drăniceru, 2025).

In addition to technological gaps, international treaties often lack robust enforcement mechanisms, leaving the responsibility for addressing airspace violations primarily to national legal systems. This creates disparities in how states define and prosecute aerial intrusions, which in turn contributes to inconsistencies in identifying the material element. Comparative legal research indicates that some states adopt broad definitions of criminal behavior in their aviation laws, while others rely on narrowly tailored provisions that may not capture the full range of potential threats (Omer Abd Alnafea Khaleel, 2023). These differences underscore the importance of a clear theoretical framework for understanding the material element, particularly in regions where geopolitical tensions heighten the risk of cross-border aerial incidents.



Overall, the theoretical framework of the material element in criminal law provides the foundation for analyzing airspace-related offenses. By defining the nature of external behavior, distinguishing acts from omissions, clarifying the components of criminal conduct, and situating the discussion within international aviation law, this section establishes the conceptual and legal basis for understanding how states classify and respond to airspace violations.

### 3. Material Element in National Legislations

The treatment of the material element of the crime of assault on state airspace varies significantly across national legal systems, reflecting differences in legislative philosophy, technological readiness, and the degree of reliance on international aviation norms. Iraq, Egypt, and the United Arab Emirates each offer distinct approaches that illuminate broader regional and doctrinal issues surrounding airspace sovereignty and criminal liability. While all three systems recognize the fundamental importance of protecting national airspace, their legislative structures reveal notable divergences in the articulation of *actus reus*, the scope of prohibited conduct, and the degree to which modern technological threats—such as drones and ballistic missiles—are incorporated into the legal framework. These divergences underscore the complexity of crafting legal responses capable of addressing emerging forms of aerial intrusion and highlight the need for comparative analysis to identify strengths, weaknesses, and opportunities for harmonization.

The Iraqi legal framework provides perhaps the most explicit textual definition of the material element in the context of criminal law. Article 28 of the Iraqi Penal Code offers a clear articulation of *actus reus*, defining it as criminal conduct manifested through either the commission of a prohibited act or the omission of an act required by law. This definition aligns with traditional criminal law theory, which emphasizes the necessity of external, observable behavior as the foundation of criminal liability. Scholars analyzing cross-jurisdictional definitions of *actus reus* highlight that the Iraqi formulation is consistent with general principles of criminal law in requiring tangible conduct that produces a legally recognized result (Jonas, 2021). However, when this general definition is applied to airspace-related offenses, various gaps become apparent. Although Iraq has enacted provisions within its Civil Aviation Law and other sectoral regulations aimed at protecting airspace sovereignty, these provisions tend to focus on traditional aviation activities involving manned aircraft and do not explicitly address modern modalities of aerial violation. For example, contemporary threats such as unmanned aerial vehicles (UAVs), long-range drones, and missile violations fall outside the explicit scope of existing Iraqi definitions, leaving enforcement authorities to rely on broad interpretive approaches rather than clear statutory guidance.

The insufficiency of express legislative coverage for drones in particular represents a substantial challenge, as UAVs have emerged as one of the most common tools used for unlawful airspace penetration in Iraq's contemporary security environment. Research examining armed group activities in Iraq demonstrates that drone-based incursions are not only technologically feasible but increasingly common, allowing hostile actors to conduct reconnaissance, gather intelligence, or execute attacks with limited detection risk (Kokha, 2021). Similarly, the absence of explicit legislative recognition of missile incursions—a phenomenon that has affected Iraq numerous times in recent years—creates doctrinal ambiguity regarding whether such conduct constitutes a conventional airspace assault, a separate category of warfare-related offense, or an act of external aggression not squarely addressed within domestic criminal law. Comparative criminal law scholars suggest that such gaps can significantly undermine legal certainty and hinder the development of stable enforcement mechanisms (Mungan, 2022). Although Iraq's legal system contains the structural foundation necessary for addressing airspace violations, it remains constrained by the limited scope of specific legislative provisions.

In contrast to Iraq, Egyptian criminal law does not provide a general definition of the material element applicable to all crimes. Rather than codifying a unified concept of *actus reus*, Egyptian law approaches the material element through scattered provisions across separate legislative domains. This sectoral approach is particularly evident in the treatment of aviation and state security offenses. Egyptian legislation governing aviation safety, airport operations, and aircraft navigation sets out detailed rules for conduct within national airspace, including prohibitions on unauthorized entry, low-altitude flight, and deviation from designated air corridors. Because these provisions are sector-specific, the definition of criminal conduct must be inferred from the context of each individual offense. Scholars studying the Egyptian legal system note that this approach is characteristic of legal systems that prioritize administrative and regulatory enforcement, especially in highly technical fields

like civil aviation (Cauia & Bria, 2021). The advantage of this model is its flexibility, enabling specialized laws to adapt to emerging threats more quickly than broad penal code provisions might allow.

However, the absence of an overarching definition of *actus reus* also introduces vulnerabilities. Without a unified doctrinal foundation, Egyptian courts must interpret criminal conduct within each specific legal context, potentially leading to inconsistencies or gaps in enforcement. Some scholars argue that the Egyptian model can obscure the relationship between criminal behavior and its resulting harm, especially in areas where aviation and state security overlap, such as the use of aircraft for espionage or military reconnaissance (Al-Tkhayneh, 2024). Additionally, although Egypt maintains robust legislation addressing hijacking, sabotage, and threats to aviation safety, its legal system faces similar technological limitations as Iraq with respect to drones and advanced aerospace technologies. While Egypt has adopted legislation concerning cybercrime and electronic interference, these laws do not provide explicit frameworks for addressing cyber-enabled intrusions into airspace control systems or the operation of autonomous aerial devices. This highlights a structural weakness: reliance on sectoral regulation can leave unaddressed the broader conceptual underpinnings necessary for dealing with emerging aerial threats.

The legal system of the United Arab Emirates represents a more modernized and technologically responsive approach to the material element of airspace-related crimes. Article 31 of the UAE Penal Code provides an explicit definition of criminal activity closely aligned with conventional conceptions of *actus reus*, requiring either the commission of a prohibited act or an omission that violates legal obligations. This definition parallels that of Iraq but is embedded within a broader criminal code that has undergone significant modernization, particularly in areas concerning national security, cyber operations, and aviation. The UAE has incorporated into its domestic legislation numerous provisions drawn from international aviation conventions, including the Chicago Convention, the Montreal Convention, and related treaties addressing aircraft hijacking, sabotage, and unlawful interference. Scholars emphasize that the UAE's reliance on international standards provides a more comprehensive and technologically aware framework for defining and prosecuting aerial violations (Kamali, 2019). This alignment with international norms ensures that the material element in UAE law captures a wide range of conduct, including emerging forms of aerial threats.

The UAE has also enacted detailed aviation security laws that explicitly address unmanned aircraft, establishing strict licensing regimes, geofencing restrictions, and criminal penalties for unauthorized operation of drones within controlled airspace. This is a significant point of divergence from Iraq and Egypt, whose legislative frameworks have not evolved to the same extent with respect to UAVs. Legal research examining the Emirati regulatory model highlights its proactive approach, which aims not only to define prohibited conduct but to prevent violations through administrative controls and technological safeguards (Munoz-Cordero, 2025). Additionally, the UAE's laws address cyber interference with aircraft systems, signaling an awareness of the increasing convergence between aviation security and digital threats. These features reflect a broad and adaptive conceptualization of the material element in airspace-related crimes.

A comparative evaluation of the three systems reveals several areas of convergence. All three jurisdictions recognize the fundamental need to protect airspace sovereignty and to criminalize conduct that infringes upon the state's exclusive control of its aerial domain. Each system identifies the material element through a combination of statutory prohibitions and interpretive principles grounded in criminal law theory, reflecting the shared understanding that external conduct forms the core of criminal liability. Furthermore, Iraq, Egypt, and the UAE all impose criminal penalties for unauthorized entry, deviation from flight paths, and acts that threaten the safety of aircraft or air navigation systems. These commonalities illustrate the extent to which airspace sovereignty is treated as an essential component of national security across the region (Vodolaskova & Головки, 2023).

However, significant differences emerge in the clarity, scope, and technological adaptability of the legislative frameworks. Iraq offers a formally clear definition of the material element but lacks specific provisions addressing modern aerial technologies. Egypt provides extensive aviation regulations but lacks a unified doctrinal foundation for *actus reus*, which may hinder consistent interpretation. The UAE stands apart for its technological responsiveness and comprehensive incorporation of international norms, providing precise statutory guidance for UAVs, cyber interference, and other contemporary threats. Comparative legal scholars argue that these differences reflect variations in legislative priorities and institutional capacity across the three states (Nahi, 2025).

The Iraqi legal system diverges most clearly from the Emirati model in its limited coverage of drones and missile-related violations. Whereas the UAE offers detailed legislative instructions derived from modern aviation standards, Iraqi law remains anchored in provisions formulated before the widespread emergence of these technologies. The Egyptian system also diverges from the Emirati model in its reliance on regulatory statutes rather than a unified criminal code structure, which can result in uneven coverage of certain forms of conduct. Yet Egypt's extensive administrative frameworks for aviation may offer valuable insights for Iraq in areas such as air traffic management and civil aviation safety (Sari, 2024).

From a comparative standpoint, several best practices emerge that Iraq could adopt to strengthen its legal treatment of airspace-related crimes. First, Iraq could benefit from integrating explicit statutory definitions of UAV-related conduct, including unauthorized use, surveillance, and weaponization, similar to those found in Emirati law. Second, incorporating international aviation conventions more comprehensively into domestic legislation would align Iraq with global norms and provide greater clarity for identifying the material element in airspace violations. Third, Iraq could adopt a dual-layered approach that combines penal code provisions with specialized aviation regulations, enabling the legal system to address both the conceptual and technical dimensions of airspace security. Finally, establishing clearer legislative language for missile-related airspace violations would close existing doctrinal gaps and strengthen Iraq's capacity to prosecute external aerial intrusions.

In sum, while Iraq, Egypt, and the UAE share common goals in safeguarding airspace sovereignty, their legislative frameworks reveal different stages of adaptation to contemporary aerial threats. A comparative analysis shows that the UAE offers the most comprehensive and technologically responsive model, Egypt provides robust sectoral regulation without a unified doctrinal foundation, and Iraq possesses a solid conceptual basis but lacks detailed provisions addressing emerging technologies. By synthesizing the strengths of these systems, Iraq can enhance the clarity, effectiveness, and modern relevance of its legal framework governing airspace-related crimes.

#### **4. Forms of Criminal Behavior as the Material Component**

The material component of the crime of assault on state airspace is manifested through a range of external behaviors that directly infringe upon the state's sovereign authority over its sky. These behaviors vary in nature, scope, and degree of threat, yet they all share the common feature of constituting tangible violations that disrupt air navigation, challenge state control, and undermine national and regional security. Modern technological development has expanded the forms of aerial misconduct beyond traditional aircraft operations to include drones, cyber-enabled interference, and advanced missile systems. A comprehensive understanding of the material element therefore requires an examination of the specific forms of criminal behavior recognized in comparative legislation and international practice. The following subsections analyze six major categories of criminal behavior that together constitute the core of airspace-related offenses.

##### *4.1. Violations of Air Navigation Rules: Failure to Adhere to Air Routes*

One of the most fundamental forms of criminal behavior constituting the material element in airspace-related offenses is the violation of designated air navigation routes. States establish specific air corridors for civil, public, and military aircraft to ensure the orderly, safe, and predictable movement of aerial traffic. Any deviation from these established routes without lawful justification constitutes prohibited conduct because such deviation threatens the structural integrity of airspace administration and can compromise aviation safety. Scholars emphasize that adherence to air routes is essential for preventing collisions, protecting critical infrastructure, and maintaining efficient coordination between air traffic control authorities and aircraft operators (Cauia & Bria, 2021). Civil aircraft are expected to maintain assigned routes to avoid interference with other flights, while public aircraft—those operated by government agencies—bear heightened obligations due to their potential security implications. Military aircraft, by contrast, present the greatest risk when deviating from air routes, as their advanced capabilities and speed can trigger security responses or diplomatic repercussions.

In Middle Eastern contexts, violations of air routes have been especially consequential. Regional instability has led to situations where military aircraft have bypassed air corridors to conduct reconnaissance missions or targeted operations without the consent of the state whose airspace they penetrate. Such intrusions are treated not only as technical violations but as direct threats to sovereignty because the state's exclusive authority to regulate flight paths forms a central component of its territorial



jurisdiction (Vodolaskova & Головкин, 2023). Iraq, for instance, has experienced repeated unauthorized entries by military aircraft engaging in operations against non-state armed groups, while Egypt's air defense systems have confronted incursions arising from regional conflicts. These incidents underscore how air-route violations can lead to escalation, miscalculation, and the destabilization of diplomatic relations.

Moreover, the increasing complexity of air navigation systems has given rise to new risks associated with deliberate or negligent route deviations. Cyber interference with onboard systems, for example, can cause aircraft to stray from assigned corridors, raising concerns that malicious actors may exploit navigation vulnerabilities to conduct attacks. Comparative legal systems recognize that violations of air navigation rules—even when carried out by civil aircraft—can have profound implications for state security, especially when the deviations occur near sensitive installations, border regions, or prohibited zones (Munoz-Cordero, 2025). These considerations elevate route violations from mere administrative infractions to significant criminal acts when they threaten national sovereignty or aviation safety.

#### 4.2. *Violations of Minimum Flight Altitudes*

A second major form of prohibited conduct involves failing to observe the minimum flight altitudes established by national aviation authorities. Minimum altitudes are designed to ensure that aircraft maintain safe distances from the ground, obstacles, and populated areas. Violations of these altitudes therefore pose immediate risks to public safety, endanger aircraft operations, and interfere with state regulatory authority. Civil aircraft flying below prescribed altitudes may expose passengers and individuals on the ground to unnecessary danger, while public aircraft may similarly create risks when conducting low-altitude maneuvers unrelated to authorized missions. Military aircraft present the most acute threats due to their capacity to fly at extremely low levels for tactical reasons, which can cause alarm among populations, disrupt civilian activity, and provoke defensive responses from air defense systems (Sari, 2024).

From a sovereignty perspective, low-altitude violations are particularly problematic because they increase the likelihood of collisions, breaches of restricted zones, and interference with critical infrastructure such as energy facilities, military bases, and air defense radars. Comparative legal analysis shows that Iraq, Egypt, and the UAE all regulate minimum flight altitudes through their civil aviation authorities, although the extent and specificity of these regulations vary. Iraq's framework relies largely on general aviation principles supplemented by civil aviation guidelines, but it lacks detailed statutory provisions addressing minimum-altitude violations by military or unmanned aircraft. Egypt, by contrast, employs sectoral regulations that impose altitude restrictions across different categories of flight, supported by administrative sanctions and criminal penalties. The UAE incorporates detailed altitude rules within a technologically advanced aviation regulatory system, including geofencing and automated altitude controls for UAVs, which help enforce compliance and prevent unauthorized low-altitude flight (Alkatbi & Alkrisheh, 2024).

Safety-related violations of minimum altitudes have led to severe consequences in multiple countries. Reports of civilian injuries, damaged property, and disruptions to domestic air traffic underscore the risks associated with irresponsible flying. Scholars note that minimum-altitude rules also serve a strategic purpose by enabling states to detect abnormal flight patterns associated with hostile intentions or criminal activity (Barus, 2021). For example, drones operated at very low altitudes can evade radar systems, making such violations a preferred tactic for surveillance or smuggling operations. Inconsistencies across national legislations in addressing these issues reflect broader gaps in adapting the law to contemporary aerial technologies.

#### 4.3. *Violations of Transit Air Passage Rules*

Transit air passage constitutes a specific regime derived from international law, particularly the law of the sea, and adapted to aviation contexts to regulate the movement of aircraft through international straits and transitional zones. Transit passage requires that aircraft conduct their transit in a continuous and expeditious manner, avoiding unnecessary delay, deviation, or operational behavior that could threaten the peace or security of the coastal state. When aircraft—especially military, public, or unmanned aircraft—engage in slow transit, aggressive maneuvers, or unauthorized landing during transit passage, their conduct may shift from lawful navigation to criminal intrusion. Comparative scholarship emphasizes that transit passage

becomes unlawful when the behavior of the aircraft exceeds operational norms and infringes upon the rights of the state responsible for the airspace in question (Kamali, 2019).

In contemporary practice, violations of transit air passage rules have been closely associated with military operations and geopolitical tensions. Aircraft may intentionally slow their transit to gather intelligence, test air defense responses, or signal military presence. Such acts, while sometimes falling within gray areas of international law, constitute criminal violations under national legislation when they threaten national security or violate specific statutory provisions. Drones have become especially relevant to transit violations because they can fly slowly, hover, or maneuver unpredictably within transitional zones, enabling operators to conduct prolonged observation or collect sensitive information. Scholars note that drones operating within straits or over narrow air corridors can create disproportionate threats due to their ability to evade detection and operate autonomously (Munoz-Cordero, 2025).

Comparative legislation among Iraq, Egypt, and the UAE reveals varying levels of clarity regarding transit rule violations. Iraq's Civil Aviation Law includes references to adherence to international air navigation rules but lacks specific language pertaining to transit passage, leaving courts to interpret violations based on broader security principles. Egypt incorporates more explicit references to international aviation standards within its administrative and criminal laws but still faces challenges in enforcing transit rules near conflict-prone zones. The UAE again offers the most comprehensive framework, integrating international treaties and domestic regulations to define transit rights and obligations, supported by advanced monitoring technologies that detect abnormal transit patterns (Nahi, 2025). These variations highlight the need for clearer statutory definitions that reflect the realities of modern aviation.

#### 4.4. *Violations of Innocent Air Passage Rules*

Innocent passage represents another foundational concept of international aviation law. Under this principle, aircraft are permitted to traverse a state's airspace without landing, provided that their passage is not prejudicial to the peace, security, or good order of the state. When aircraft engage in conduct that exceeds the bounds of innocent passage—such as carrying weapons, conducting espionage, engaging in military maneuvers, or transmitting harmful substances—their passage becomes non-innocent and therefore unlawful. Legal scholars highlight that innocent passage is contingent not merely on the physical act of flying but also on the purpose and nature of the aircraft's activities (Ibrahim et al., 2025).

Non-innocent passage can take many forms. Espionage conducted through aircraft equipped with advanced sensors or cameras represents a serious breach of sovereignty, especially when conducted by state-owned or military aircraft. The use of force—such as firing weapons, simulating attack maneuvers, or deploying electronic warfare tools—automatically renders passage unlawful. Even civilian aircraft can violate innocent passage when used to transport hazardous materials, contraband, or individuals who threaten national security. Additionally, aircraft that cause pollution, environmental damage, or interference with communication systems can be classified as engaging in non-innocent passage (Ajmal, 2023).

States retain the right to intercept, challenge, or compel the landing of aircraft suspected of engaging in non-innocent passage. Egypt has exercised this right in cases where foreign aircraft have passed near sensitive areas, while Iraq retains similar authority under its national security framework. The UAE, relying on advanced air defense technologies, is capable of identifying and responding to non-innocent passage with precision, including through electronic interception. The increasing use of drones complicates enforcement, as UAVs may conduct non-innocent passage without clear identification or communications, requiring states to adopt new detection technologies and legal frameworks (Drăniceru, 2025). Comparative analysis shows that legal systems often struggle to classify drone behavior within traditional innocent-passage frameworks, indicating the need for legislative updates.

#### 4.5. *Aerial Piracy and Aircraft Hijacking*

Aerial piracy and aircraft hijacking represent some of the most severe forms of criminal behavior affecting air navigation and sovereignty. These offenses typically involve the use of violence, threats, coercion, or sabotage to seize control of an aircraft, endanger its occupants, or manipulate its navigation. International conventions such as the Tokyo Convention (1963), the Hague Convention (1970), and the Montreal Convention (1971) form the legal backbone for defining and prosecuting these

offenses at the global level. Scholars emphasize that these conventions establish clear standards for what constitutes unlawful seizure, interference, or destruction of aircraft and impose obligations on states to criminalize such conduct within their domestic legal systems (Jonas, 2021).

In practice, aerial piracy may involve private aircraft, public aircraft, or warplanes. Private aircraft are typically targeted for illicit gain, including robbery, smuggling, or hostage-taking. Public aircraft—operated by government agencies—may be targeted for political or strategic reasons, often involving demands or threats directed at state authorities. Military aircraft may also be subject to hijacking or sabotage, particularly in conflict zones where control of aircraft can shift the balance of power. Legal scholars note that the adaptability of aerial piracy across these categories underscores its destructive potential and the need for robust legal measures to counter it (Al-Tkhayneh, 2024).

Emerging threats further complicate the landscape of aerial piracy. Cyber-hijacking, for example, involves the manipulation of aircraft systems through cyber intrusion, allowing attackers to redirect or disable aircraft remotely. Drones can also be hijacked electronically, enabling unauthorized operators to take control of UAVs for surveillance or attack purposes. Studies warn that the future of aerial piracy will increasingly involve digital threats rather than purely physical attacks, requiring states to modernize their legal frameworks to address cyber-enabled forms of aircraft interference (Ibrahim et al., 2025). Middle Eastern states have experienced incidents of attempted drone hijacking, as well as unauthorized remote control of navigation systems, underscoring the urgency of legal reform in this domain.

#### 4.6. *Unlawful Entry of Airspace: Civil, Military, Unmanned Aircraft, and Missiles*

Unlawful entry into national airspace represents one of the broadest and most significant categories of criminal behavior constituting the material element of airspace assault. Such entry includes penetration by civil aircraft operating without authorization, military aircraft conducting reconnaissance or attack missions, unmanned aircraft systems engaged in surveillance or strike operations, and intercontinental ballistic missiles crossing airspace during conflict or escalation. Comparative studies highlight that unlawful entry by any type of aircraft constitutes a serious violation of sovereignty because it infringes on the exclusive authority of the state to regulate and control its aerial domain (Vodolaskova & Головкин, 2023).

Drones have become the most common tool for unlawful entry in recent years. Their small size, low radar signature, and remote operation make them ideal for espionage, targeted attacks, smuggling, and intelligence gathering. Reports from conflict zones in Iraq and Syria indicate widespread use of drones by both state and non-state actors to penetrate airspace undetected and conduct reconnaissance over military facilities, energy infrastructure, and government buildings (Kokha, 2021). These activities not only violate airspace regulations but also pose direct threats to national security. In Egypt, drones have been intercepted near sensitive border areas, prompting the adoption of stricter UAV regulations.

Military aircraft and warplanes also frequently engage in unlawful entry during regional conflicts, conducting airstrikes, reconnaissance missions, or intimidation flights. Such intrusions are often politically motivated and can escalate into military confrontations. Comparative legal analysis shows that the UAE has adopted detailed legislation covering unauthorized military entry, while Iraq and Egypt rely more on general security laws supplemented by aviation regulations (Nahi, 2025).

Missile-related violations represent perhaps the most technologically advanced and destructive form of unlawful entry. Intercontinental ballistic missiles and other long-range weapons traverse airspace at extremely high altitudes and speeds, making detection and interception difficult. These weapons can carry conventional explosives, chemical agents, or even nuclear materials, significantly elevating the threat level. Scholars warn that the legal classification of missile incursions remains underdeveloped in many national systems despite their profound implications for sovereignty and security (Munoz-Cordero, 2025). Autonomous drone swarms and satellite-guided weapons pose similar challenges, as they can navigate complex trajectories and operate without continuous human control.

The criminal liability associated with unlawful entry extends to both individuals and states. Operators who control drones or aircraft remotely may face prosecution if their conduct violates national airspace, while states responsible for missile launches or military incursions may be held accountable under international law. Comparative legal scholarship underscores the need for modernized legislation capable of addressing these emerging technologies effectively (Drăniceru, 2025).

Collectively, these six categories illustrate the multifaceted and evolving nature of criminal behavior constituting the material element of airspace assault. They demonstrate how modern aviation technologies and geopolitical dynamics have reshaped traditional concepts of airspace sovereignty and necessitated comprehensive legislative responses.

## 5. Criminal Result and the Causal Relationship

The material element of any criminal offense must culminate in a result that the legal system recognizes as harmful, wrongful, or injurious. In crimes involving the assault on a state's airspace, the criminal result assumes both material and legal dimensions, reflecting the dual nature of harm produced by aerial violations. The physical manifestation of the result may involve damage to aircraft, destruction of infrastructure, or casualties arising from aerial misconduct, but the legal result extends beyond the immediate material consequences to encompass deeper infringements on sovereignty, territorial integrity, and national security. Scholars note that the criminal result in public-order and state-security offenses is often broader and more abstract than in conventional crimes because these offenses target the essential interests of the state rather than individual victims (Jonas, 2021). The criminal result in airspace violations thus operates simultaneously in tangible and intangible realms, making it a uniquely complex feature of the material element.

The material result refers to observable changes in the external world caused by the offender's conduct. In the context of airspace assaults, these changes may include physical damage to facilities, aircraft collisions, interference with navigation systems, or the destruction of property located within the flight path of unauthorized aircraft. For instance, unauthorized low-altitude flying may result in damage to civilian structures or critical infrastructure, while unmanned aerial vehicles used for hostile purposes may destroy communication towers or security installations. Scholars studying airspace sovereignty emphasize that such material harms are often symptomatic of deeper systemic vulnerabilities, reflecting gaps in national defense systems or limitations in radar detection capabilities (Sari, 2024). These tangible outcomes are relatively straightforward to identify, and they form the basis for establishing liability under domestic criminal law, which traditionally relies on observable evidence to substantiate the occurrence of harm.

The legal result is more abstract but no less significant. It refers to the violation of state sovereignty, the undermining of territorial control, and the disruption of military or security functions. When an aircraft enters national airspace without authorization, even without causing physical harm, the legal result is the infringement upon the state's exclusive right to control passage through its airspace. The conceptual basis for this form of harm has roots in international law, which affirms that states maintain full and exclusive sovereignty over the airspace above their territory. Comparative legal scholars argue that airspace violations intrinsically undermine this sovereignty, thereby producing a legal result regardless of whether material damage occurs (Vodolaskova & Головкин, 2023). Such violations may impair a state's ability to regulate aviation, impose security protocols, and protect citizens, thereby compromising the institutional mechanisms tasked with ensuring order and safety.

The legal result of airspace intrusions is amplified when the violation affects national defense structures. Unauthorized overflight by military aircraft, for example, can disrupt defense protocols, expose vulnerabilities, or trigger military responses. When unmanned aircraft or drones penetrate restricted areas, they can gather intelligence, capture images of sensitive facilities, or transmit information to hostile actors. Scholars warn that these forms of harm, though not always immediately visible, pose significant threats because they erode the state's defensive posture and expose strategic weaknesses (Munoz-Cordero, 2025). Additionally, missile incursions can produce both material and legal results, given that even a missile passing through national airspace constitutes an act of aggression under international law. Such incursions undermine national security, disrupt civilian life, and potentially escalate regional tensions.

Understanding the types of harm caused by airspace assaults requires distinguishing between physical, sovereignty-related, and security-oriented harms. Concrete physical harm occurs when aircraft collisions, debris fallout, drone strikes, or missile impacts result in injury to individuals, destruction of property, or disruption of public infrastructure. These harms often attract significant public attention because they involve direct consequences for the civilian population. Comparative criminal law literature highlights that such harms are typically easier to prove because they involve visible outcomes supported by forensic evidence, eyewitness testimony, and physical documentation (Cauia & Bria, 2021). Airspace violations resulting in aircraft damage or casualties fall squarely within this category and form the basis for prosecuting the offender under traditional criminal statutes.

Sovereignty-related harms, by contrast, are often invisible yet equally significant. Any unauthorized penetration of national airspace challenges the state's authority and constitutes an assault on its territorial autonomy. Scholars emphasize that sovereignty harms arise whenever the state's exclusive right to control, regulate, or restrict air traffic is breached, regardless of the motivations or outcomes of the intrusion (Nahi, 2025). These harms reflect an attack on the political and legal status of the state, undermining its ability to exercise its sovereign functions. For example, low-level reconnaissance flights conducted by foreign military aircraft or drones interfere with the nation's internal affairs by obtaining information without consent, thereby violating sovereignty and potentially influencing domestic governance or military strategies.

Security harms represent another major category of harm arising from airspace violations. These harms involve conduct that threatens national defense, intelligence systems, or public safety. Espionage conducted through aircraft equipped with sophisticated surveillance tools is one such harm. Scholars studying intelligence-gathering techniques have noted that aerial surveillance enables hostile actors to monitor troop movements, assess infrastructure vulnerabilities, or gather other sensitive data (Ibrahim et al., 2025). Such activities severely compromise national security and can precipitate broader military or geopolitical consequences. Additionally, drones deployed by non-state armed groups to carry explosives or conduct reconnaissance missions intensify security risks by bypassing traditional detection systems. These harms often remain undetected until they have already weakened the state's defensive capacity or created opportunities for future attacks. In such cases, the criminal result arises not only from the immediate act but from the cumulative impacts on national stability.

Establishing causation in airspace-related offenses is one of the most challenging aspects of proving the material element, particularly when the conduct involves advanced technologies such as drones, stealth aircraft, or ballistic missiles. Causation requires demonstrating the direct link between the offender's behavior and the resulting harm. In traditional criminal cases, such as theft or assault, causation is relatively straightforward because the relationship between conduct and result can be readily observed. However, in airspace offenses, the conduct may be remote, automated, or technologically complex, complicating the evidentiary burden. Scholars argue that causation in airspace violations often depends on technical data rather than human observation, requiring courts to rely on expert testimony and advanced forensic analysis (Mungan, 2022).

One major challenge arises in cases involving unmanned aircraft systems. Drones may be operated remotely from long distances, making it difficult to identify the operator or establish control over the device. Their ability to fly anonymously and evade radar detection exacerbates this challenge, as the evidentiary trail necessary to prove causation is often fragmented or incomplete. Comparative legal research shows that states are increasingly relying on radar tracking systems, radio frequency analysis, and geolocation technologies to link drone activity to individual operators (Drăniceru, 2025). However, these technologies require sophisticated infrastructure and expertise, which some countries—particularly those facing ongoing conflict or resource limitations—may lack.

Missile incursions pose even greater challenges for establishing causation. Because missiles travel at extremely high velocities, fracture upon impact, and may originate from distant locations, identifying the responsible actor can require complex intelligence assessments. Scholars analyzing modern conflict dynamics note that satellite imagery, thermal detection sensors, and advanced radar systems play crucial roles in reconstructing missile trajectories and determining their point of origin (Munoz-Cordero, 2025). Nevertheless, these forms of evidence can be subject to technical errors, data manipulation, or competing interpretations, making causation difficult to prove beyond a reasonable doubt. In regions with multiple state and non-state actors, such as the Middle East, the challenge becomes even more pronounced due to overlapping military engagements and contested airspace.

To address these difficulties, states rely on various forms of technological evidence. Radar tracking provides the most direct source of information on aircraft movements, documenting altitude, speed, trajectory, and time of entry. Satellite data supplements this information by capturing aerial imagery and tracking missile paths. Aviation logs, including flight plans, communications records, and transponder data, serve as essential tools for reconstructing the sequence of events leading to the alleged violation. Scholars studying aviation safety note that combining these sources of evidence enhances reliability and strengthens the causal link between conduct and result (Cauia & Bria, 2021). However, the coordination required to gather, process, and interpret this data often depends on inter-agency cooperation and, in some cases, international assistance.

Despite these complexities, establishing causation remains an essential requirement of the material element in airspace-related crimes. Without demonstrating that the criminal result stems directly from the offender's conduct, liability cannot be



imposed. This requirement ensures fairness in prosecution and maintains the integrity of the criminal justice system. As aerial technologies continue to evolve, legal systems must adapt their evidentiary standards and investigative tools to ensure that the causal relationship can be proven with the same rigor as in traditional crimes.

## 6. Comparative Analysis

The legal treatment of airspace violations in Iraq, Egypt, and the United Arab Emirates reflects the interplay between traditional criminal law principles and modern technological developments that increasingly shape aerial activity. Each national system recognizes the need to safeguard state sovereignty and protect national airspace from unauthorized or hostile intrusions. Yet the legislative philosophies, structural frameworks, and technological responsiveness of the three systems reveal meaningful differences grounded in the unique political, security, and administrative environments in which their laws were developed. Examining these legal regimes comparatively offers insight into the strengths and limitations of each approach and demonstrates how regional legal systems grapple with the evolving nature of aerial threats in an era defined by drones, cyber interference, and advanced weaponry.

Iraqi legislation provides a clear foundation for defining criminal behavior through its general criminal law, especially Article 28 of the Iraqi Penal Code, which articulates the material element of the offense as the commission of an act criminalized by law or the omission of an act required by law. This definition embodies classical criminal law doctrine by grounding liability in observable conduct, and its clarity aligns well with conceptual frameworks emphasized in comparative criminal scholarship (Jonas, 2021). However, when examined in the context of airspace-related crimes, the limitations of the Iraqi framework become apparent. While Iraq has enacted provisions within its Civil Aviation Law to regulate aircraft operations, flight paths, and aviation safety, these provisions primarily address traditional aviation rather than modern aerial technologies. Unmanned aerial vehicles, for example, have increasingly penetrated Iraqi airspace due to the presence of non-state actors and foreign military operations, yet no explicit statutory provisions address their operation or misuse (Kokha, 2021). This omission poses a significant challenge for law enforcement, as UAVs are among the most common tools for unauthorized surveillance, intelligence gathering, or targeted strikes in modern conflict zones.

Missile incursions represent an additional legislative gap within Iraqi law. Iraq has repeatedly experienced cross-border missile activity, particularly within the context of regional rivalries and military operations. Yet its existing legal framework lacks provisions directly addressing missile overflights or ballistic trajectory violations. Scholars examining technological advancements in aerial warfare emphasize that missile incursions produce not only physical risks but also profound sovereignty harms that, in modern criminal law, require explicit statutory recognition (Munoz-Cordero, 2025). Iraqi legislation thus provides conceptual tools for defining criminal behavior but lacks the detailed, technologically informed provisions necessary for addressing contemporary aerial threats comprehensively.

Egyptian law stands in contrast to the Iraqi model by adopting a sector-based approach to regulating airspace violations rather than codifying a unified concept of the material element. Unlike Iraq and the UAE, Egypt does not articulate a general statutory definition of *actus reus*. Instead, Egyptian criminal law relies on specialized statutes—primarily aviation laws, security laws, and administrative regulations—to define prohibited conduct in the aviation context. This legislative style reflects the Egyptian legal tradition, in which administrative and sectoral laws play a central role in regulating public-order offenses. Scholars emphasize that this model allows for flexibility and rapid adaptation in fields such as aviation, where technological change necessitates frequent regulatory updates (Cauia & Bria, 2021).

The strengths of the Egyptian approach lie primarily in its detailed regulatory provisions governing flight paths, altitude restrictions, air traffic management, and airport operations. Egyptian aviation law specifies strict requirements for civil and military aircraft operating within national airspace, and violations of these requirements—such as flying without a permit or deviating from approved routes—carry administrative and criminal penalties. These provisions operate within a broader security context in which Egypt has long confronted threats from both state and non-state actors operating aircraft or drones near sensitive regions such as the Sinai Peninsula. Legal scholars note that Egypt's regulatory model has facilitated consistent enforcement, particularly where airspace violations overlap with counterterrorism operations or national security concerns (Al-Tkhayneh, 2024).

However, despite these strengths, the Egyptian system faces significant limitations. The absence of a general definition of the material element means that courts must interpret prohibited conduct within the narrow context of each specialized statute. This fragmentation can lead to inconsistency in judicial interpretation and uncertainty regarding the doctrinal basis of criminal liability. Furthermore, Egyptian law has not fully adapted to technological developments involving drones, cyber interference with aircraft systems, or autonomous flight technologies. While Egypt has implemented some regulations addressing UAV operations, these rules remain largely administrative and do not constitute a comprehensive criminal framework capable of capturing the wide range of threats posed by modern aerial technology. Scholars argue that this gap reflects a broader challenge faced by systems that rely heavily on regulatory legislation: when new threats emerge outside existing regulatory domains, legal systems may struggle to incorporate them cohesively (Ibrahim et al., 2025).

The Emirati legal system provides the most technologically sophisticated and internationally harmonized framework among the three. The UAE Penal Code explicitly defines the material element through Article 31, which, similar to Iraq's Article 28, encompasses both the commission and omission of legally relevant conduct. However, the UAE approach differs significantly in its integration of international aviation conventions and its incorporation of modern technologies into domestic legislation. Emirati aviation law draws heavily on the Chicago Convention and subsequent international treaties, including those addressing aircraft hijacking, sabotage, and unlawful interference (Kamali, 2019). This alignment with international norms ensures coherence with global aviation standards and facilitates cooperation with international bodies such as the International Civil Aviation Organization (ICAO).

One of the most distinctive aspects of Emirati legislation is its detailed regulation of unmanned aircraft systems. Unlike Iraq and Egypt, the UAE has enacted comprehensive laws governing the registration, licensing, operation, and permissible areas of flight for drones. These laws incorporate geofencing technologies, mandatory registration systems, and criminal penalties for unauthorized drone operation. Scholars note that this proactive regulatory environment reflects the UAE's broader commitment to technological innovation and national security modernization (Munoz-Cordero, 2025). Emirati law also addresses cyber threats to aviation, making it one of the few regional systems to explicitly criminalize electronic interference with aircraft systems and air navigation infrastructure.

A comparative evaluation of these three legal systems reveals meaningful areas of convergence. All three states recognize the necessity of protecting airspace sovereignty and maintaining strict control over aerial operations within their territories. They also criminalize unauthorized entry, deviation from assigned routes, and conduct that threatens the safety of aircraft or the integrity of air navigation systems. These shared principles reflect broader international norms that conceptualize airspace sovereignty as a core component of statehood (Vodolaskova & Головки, 2023).

Yet the differences among the systems are more significant. Iraq possesses a strong conceptual definition of criminal conduct but lacks legislative detail and technological specificity. Egypt provides a comprehensive regulatory environment but lacks a unified doctrinal foundation for the material element and has not fully addressed emerging aerial threats. The UAE offers the most complete and modern framework, characterized by detailed statutory provisions, sophisticated technological integration, and strong alignment with international aviation law. Scholars argue that these divergences reflect differing levels of institutional capacity, political stability, and technological development (Nahi, 2025).

Iraq diverges most significantly from the Emirati model in its failure to explicitly address drones and missiles. Given the prevalence of drone activity by non-state armed groups in Iraq, this legislative omission poses a practical obstacle to criminal enforcement. Egypt diverges in its structural approach, relying on administrative regulation rather than coherent penal principles, which may complicate judicial interpretation in complex cases. The UAE's approach—combining penal clarity, regulatory detail, and technological infrastructure—demonstrates best practices that could be adopted across the region.

Several elements of Emirati legislation offer valuable guidance for Iraqi legal reform. First, the explicit statutory recognition of UAV-related offenses would allow Iraq to address the most pressing aerial threats facing the country. Second, incorporating international aviation conventions more comprehensively would ensure alignment between domestic law and global standards, reducing interpretive gaps and strengthening legal certainty. Third, adopting technological enforcement mechanisms—such as mandatory drone registration, electronic tracking, and geofencing—would help Iraq and Egypt manage unauthorized aerial activity more effectively (Drăniceru, 2025).

In conclusion, while Iraq, Egypt, and the UAE share a commitment to safeguarding national airspace, their legislative frameworks reflect widely varying levels of modernization and adaptability. A comparative analysis demonstrates that Iraq and Egypt possess foundational elements necessary for effective regulation but require significant development to address contemporary aerial threats. The UAE provides a model of robust, technologically integrated legislation that aligns national law with international standards and anticipates emerging threats. By adopting aspects of the Emirati model, Iraq and Egypt could strengthen their legal frameworks and enhance their capacity to respond to the evolving challenges of airspace sovereignty in an era of rapid technological change.

## 7. Conclusion

The crime of assault on a state's airspace represents one of the most complex and rapidly evolving areas of contemporary criminal law, reflecting the growing strategic, technological, and geopolitical significance of national airspace in the twenty-first century. This study has demonstrated that the material element of this crime encompasses a wide range of external behaviors that directly encroach upon a state's sovereign authority, threaten aviation safety, or undermine national security. These behaviors—whether involving violations of flight paths, unauthorized low-altitude operations, misuse of transit or innocent passage, aircraft hijacking, or unlawful entry by civil, military, unmanned, or missile systems—constitute the observable foundation upon which criminal responsibility is constructed. As airspace becomes increasingly congested with diversified actors and technologies, the clarity and precision of legislative definitions assume central importance in ensuring that states can effectively protect their aerial domain.

A comparative analysis of Iraqi, Egyptian, and Emirati legislation reveals that while all three legal systems share a foundational commitment to safeguarding sovereignty and ensuring the integrity of air navigation, they differ significantly in the scope, detail, and technological responsiveness of their legal frameworks. Iraq offers a clear and conceptually sound definition of the material element through its Penal Code but lacks specific statutory provisions capable of regulating modern aerial technologies, especially drones and ballistic missiles. This gap has become increasingly problematic given the frequency of unmanned aerial intrusions and missile-related violations in Iraqi airspace, which demand explicit legislative attention. Egypt, by contrast, relies heavily on sectoral regulation through administrative and aviation laws. This model provides substantial detail in regulating traditional civil aviation but suffers from fragmentation and the absence of a unified doctrinal foundation for the material element, making it less adaptable to emerging threats. The United Arab Emirates presents the most comprehensive and technologically advanced framework, integrating international aviation conventions, detailed domestic statutes, and regulatory systems designed to manage drones, cyber threats, and complex aerial operations. The Emirati model demonstrates the benefits of combining penal clarity with technical regulation, creating a legal environment capable of addressing both conventional and cutting-edge forms of airspace violations.

Across the three systems, several themes emerge that highlight the evolving nature of airspace sovereignty in modern law. First, technological development has redefined the types of conduct that constitute criminal behavior in the aerial domain. Traditional frameworks built around manned aircraft are no longer sufficient to address the challenges posed by unmanned systems, autonomous drones, hypersonic missiles, and cyber-enabled interference. As a result, states must modernize their definitions of *actus reus* to reflect these realities. Second, the increasingly blurred boundaries between civil, military, and intelligence-related aerial activities complicate the application of existing legal provisions. Many contemporary violations do not fit neatly within traditional categories, requiring legislators to adopt broader, more integrated approaches to regulating airspace. Third, national laws must align more closely with international standards to ensure clarity, consistency, and effective cross-border cooperation. This is particularly important given the inherently transnational nature of aerial threats, as well as the reliance of modern aviation systems on global regulatory frameworks.

The analysis also underscores the critical importance of the criminal result and causal relationship in constructing liability for airspace offenses. In many cases, the harm caused by airspace violations is not immediate or physical but takes the form of infringements on sovereignty, disruptions to national defense systems, or intelligence gathering. These forms of harm, although less visible, are equally significant and must be recognized within legal definitions of criminal result. Establishing causation in airspace offenses presents additional challenges, especially when dealing with unmanned systems or missile trajectories. The

reliance on technical evidence—such as radar data, satellite imagery, and aviation logs—illustrates the need for advanced investigative capacity and specialized expertise within law enforcement and judicial institutions.

Taken together, the findings of this study suggest that Iraq and Egypt would benefit from adopting aspects of the Emirati approach to modernizing airspace legislation. Explicit provisions addressing drones, cyber interference, and missile incursions would enhance legal certainty and provide clearer guidance for enforcement authorities. Integrating international aviation conventions more comprehensively into domestic law would also strengthen the doctrinal coherence of their legal systems. For Iraq in particular, where airspace violations by non-state actors pose acute security risks, legislative reform is not merely desirable but essential.

Ultimately, the crime of assault on airspace is no longer confined to traditional paradigms of aviation. It now encompasses a broad spectrum of behaviors enabled by technological innovation and shaped by geopolitical tensions. Legislators must adapt to this evolving environment by crafting comprehensive, forward-looking legal frameworks that accurately reflect the realities of modern aerial activity. The future of airspace regulation depends on the ability of national legal systems to anticipate new threats, harmonize with international norms, and maintain a clear doctrinal foundation capable of guiding courts, law enforcement agencies, and policymakers. This study offers a foundation for understanding these challenges and identifying pathways toward more effective protection of state sovereignty in an increasingly complex aerial domain.

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All procedures performed in this study were under the ethical standards.

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