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Security Challenges and Air Sovereignty: Between Escalating Threats and the Need for Fortification

Abstract

Air sovereignty affronts escalating security challenges driven by technological advancements, including the use of drones, long-range missiles, and cyberattacks targeting aerial systems. These threats jeopardize national security and compel states to enhance their defensive capabilities and modernize traditional systems. Achieving air sovereignty also necessitates a delicate balance between national protection and international cooperation, while adhering to international air law. The solution lies in investing in advanced technology, strengthening the legal framework, and developing integrated strategies to fortify airspace against mounting threats, thereby ensuring stability and security for all.

Keywords: *security challenges, air sovereignty, escalating threats, fortification requirements, technological advancements*

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Təhlükəsizlik çağırışları və hava suverenliyi: artan təhdidlər və möhkəmləndirmə ehtiyacı arasında

Xülasə

Hava suverenliyi texnoloji irəliləyişlərin, o cümlədən pilotsuz təyyarələrin, uzaqmənzilli raketlərin və hava sistemlərini hədəf alan kiberhücumların istifadəsi ilə bağlı artan təhlükəsizlik çağırışlarını pozur. Bu təhdidlər milli təhlükəsizliyi təhlükə altına alır və dövlətləri öz müdafiə imkanlarını gücləndirməyə və ənənəvi sistemləri modernləşdirməyə məcbur edir. Hava suverenliyinə nail olmaq həm də beynəlxalq hava hüququna riayət etməklə milli mühafizə və beynəlxalq əməkdaşlıq arasında incə tarazlığın olmasını tələb edir. Həll yolu qabaqcıl texnologiyaya sərmayə qoymaqdan, qanunvericilik bazasını gücləndirməkdən və artan təhlükələrə qarşı hava məkanını möhkəmləndirmək və bununla da hamı üçün sabitlik və təhlükəsizliyi təmin etmək üçün integrasiya olunmuş strategiyaların işlənilməsindən ibarətdir.

Açar sözlər: *təhlükəsizlik çağırışları, hava suverenliyi, artan təhdidlər, istehkam tələbləri, texnoloji irəliləyişlər*

Introduction

Amidst the rapid technological advancements and the growing reliance on aerial systems in warfare, economy, and transportation, air sovereignty has become a cornerstone for safeguarding national security. However, this sovereignty faces unprecedented challenges, ranging from drones and precision missiles to cyberattacks targeting surveillance and control systems.

These escalating threats compel states to reconsider their defensive strategies, enhance technological capabilities, and foster international cooperation to fortify their airspace. This underscores the importance of studying this issue to understand current challenges and anticipate future mechanisms for ensuring sustainable and secure air sovereignty.

Research

Significance of the Topic

Air sovereignty is one of the fundamental pillars of national security, as the effective protection of airspace is a top priority in national defense. With the rise in security threats such as drones and cyberattacks, the need to develop defensive and technological strategies to secure airspace has become increasingly evident. The significance of the topic can be summarized as follows:

1. National Security: Maintaining safe airspace is a key component of national sovereignty.
2. Technological Advancement: Addressing the use of advanced technologies in aerial threats.
3. International Law: Strengthening legal frameworks to ensure airspace protection.
4. Global Cooperation: Highlighting the importance of international partnerships in addressing aerial threats.

Study Objectives

The study, titled “Security Challenges and Air Sovereignty: Between Escalating Threats and Fortification Requirements,” aims to achieve the following objectives:

1. Identify the security challenges threatening air sovereignty.
2. Analyze the impact of modern technology on airspace security.
3. Propose mechanisms to fortify air sovereignty and mitigate risks.
4. Raise awareness of the importance of international cooperation in airspace security.

Study Problem

The problem addressed in “Security Challenges and Air Sovereignty: Between Escalating Threats and Fortification Requirements” revolves around how states can confront the growing threats to their air sovereignty, such as drones and cyberattacks, while maintaining a balance between strengthening national security and fostering international cooperation. In the face of rapid technological advancements, there is a pressing need to develop effective defensive strategies and update legal systems to ensure airspace protection without compromising international obligations. Based on this, the following research question arises (Almarakbi & Sayed Abdel Moneim, 2005):

How can states confront the growing security challenges threatening air sovereignty amidst technological advancements and the rise of unconventional attacks?

Sub-Questions

The primary question gives rise to several sub-questions:

- What are the most prominent security threats to air sovereignty in the modern era?
- How do advanced technologies, such as drones and cyberattacks, impact airspace security?
- What modern defensive mechanisms are required to fortify air sovereignty against these threats?
- How can national and international legal systems be updated to address security challenges in the domain of air sovereignty?
- What is the role of international cooperation in enhancing air security and safeguarding air sovereignty?

Main Hypothesis

The escalating security threats to air sovereignty, such as drones and cyberattacks, necessitate the modernization of air defense strategies and the development of advanced technologies, coupled with strengthened international cooperation, to secure airspace and protect national security without compromising international legal obligations (Al-Samarani & Fatima Habib Shabib, 1989).

Sub-Hypotheses

1. Technological advancements pose a direct threat to air sovereignty.

2. International cooperation is a critical factor in addressing air security challenges.
3. Traditional defense systems require modernization to cope with emerging threats.

Research Methodologies

To study "Security Challenges and Air Sovereignty: Between Escalating Threats and Fortification Requirements," selecting appropriate methodologies is essential for understanding the security threats to air sovereignty and the means to fortify it. The following approaches will be utilized:

- **Descriptive Method:** To describe the security challenges facing airspace.
- **Analytical Method:** To examine and analyze the impact of these threats on national security.
- **Comparative Method:** To study the strategies employed by different states in addressing these threats and to analyze the legal and political frameworks related to air sovereignty protection.

These methodologies will provide a comprehensive perspective on how to develop effective strategies to protect airspace and ensure national security amid modern threats.

Study Axes

To address this topic, the study is divided into the following axes:

Axis 1: The Concept of Air Sovereignty and Its Importance for National Security

Axis 2: Contemporary Security Challenges to Air Sovereignty

Axis 3: The Role of Technology in Addressing Challenges

Axis 4: Mechanisms of International Cooperation to Strengthen Air Sovereignty

Axis 1: The Concept of Air Sovereignty and Its Importance for National Security

Air sovereignty is a strategic and vital concept for states in the modern era, particularly in the context of evolving military and technological threats. It reflects the ability to exercise full control over a nation's airspace, whether for protecting its territory or enhancing its capacity to make sovereign decisions without external interference. As armed conflicts and military technologies have advanced, air sovereignty has become a key element for achieving national security and ensuring political and economic stability (Al-Kubaisi & Bashir Jumaa Abdul Jabbar, 2013).

Legally and politically, air sovereignty refers to a state's right to exert complete and exclusive control over the airspace above its territory and territorial waters. This includes regulating the use of this airspace by civilian and military aircraft and preventing unauthorized incursions by external parties. The concept extends from territorial sovereignty and represents a state's ability to safeguard its national security and vital interests through control of its skies.

This right is enshrined in international law through various agreements, such as the 1944 Chicago Convention on International Civil Aviation, which asserts in its first article that "The contracting States recognize that every State has complete and exclusive sovereignty over the airspace above its territory." Any breach of this airspace without prior authorization constitutes a violation of international law. International practices affirm that this right is closely tied to a state's political independence and self-determination, barring voluntary surrender of parts of its sovereignty through adherence to international agreements (Associated Press, 2019).

Practical Implications of Air Sovereignty

In practice, air sovereignty manifests in a state's right and ability to freely conduct its activities within its territory while ensuring it does not harm other states. This involves employing advanced technologies and sophisticated air defense systems to protect its airspace from threats and managing and regulating the movement of civilian and commercial aircraft to ensure safe air transport within its borders and internationally. Generally, the use of airspace can be categorized into three key areas: aviation and aerospace, satellites, and transportation, communication, and the internet.

Thus, air sovereignty represents a critical element of a state's sovereignty and national security. It encompasses legal, military, and economic dimensions that reflect a state's ability to control and

protect its airspace from potential threats. These dimensions include the following (Algerian News Agency, 2020):

Key Dimensions of Air Sovereignty

1. The Legal and Sovereign Dimension

Air sovereignty is one of the fundamental rights of states under international law, granting them the authority to control the airspace above their territories. This includes the right to permit or deny access to foreign aircraft in accordance with the 1944 Chicago Convention on International Civil Aviation. This right enables states to regulate air traffic, grant or deny permission for foreign aircraft to use their airspace, and enforce legal protections against violations by other states. Such violations could involve unauthorized aircraft or espionage activities, ensuring the protection of air borders from hostile or unlawful activities.

2. The Military and Security Dimension

Air sovereignty entails a state's capability to maintain full control over its airspace, preventing its misuse by adversaries. This dimension is strategic for national defense, as air superiority enhances a state's ability to support land and maritime operations through continuous surveillance and swift responses to potential threats. Air dominance is a decisive factor in military conflicts, as controlling the skies is essential to safeguarding military and civilian assets on the ground. Furthermore, air sovereignty allows states to efficiently deploy defensive and offensive capabilities to deter external aggression.

For instance, recent security tensions between Algeria and Morocco prompted Algeria to close its airspace to Moroccan aircraft. Similarly, many nations caution airlines against flying over Syrian, Afghan, or Ukrainian airspace due to security risks. Such warnings stem from incidents like the 2014 crash of a Malaysian airliner in Ukrainian airspace. These examples highlight the critical role of air sovereignty in mitigating threats and ensuring safety during regional or international conflicts (Ahmad & Irdham, 2022).

3. The Humanitarian, Environmental, and Health Dimension

Airspace control plays a vital role in coordinating rescue and relief operations during natural disasters or wars, underscoring a state's humanitarian responsibilities. Additionally, it helps address environmental challenges linked to air travel, such as reducing air pollution and noise. For example, during the COVID-19 pandemic in 2020, Algeria closed its borders, including its airspace, as a preventive measure to curb the spread of the virus. This action demonstrated how air sovereignty can be exercised to protect public health and respond to environmental and humanitarian needs.

4. The Economic Dimension

Airspace is an economic asset and a vital resource for states. It generates revenue through overflight fees and its regulation for commercial and civil aviation. Investments in critical airport infrastructure and the development of national airlines significantly contribute to economic growth. Additionally, the efficient use of airspace fosters international trade and enhances global connectivity, further boosting the national economy.

5. The Political and Diplomatic Dimension

Air sovereignty reflects a state's strength and standing in the international community, showcasing its ability to protect its airspace from external interference. It also bolsters foreign policy, as airspace can serve as a diplomatic tool. States may impose restrictions on foreign aircraft as a form of political pressure or offer airspace access to allies as a sign of support. For example, in 2019, Pakistan closed its airspace to the Indian president's aircraft amidst heightened tensions over the Kashmir region, demonstrating how air sovereignty can influence international relations.

6. The Technological and Scientific Dimension

With advancements in technology, air sovereignty has become closely linked to scientific progress and innovation. Controlling airspace allows states to employ advanced technologies for

defense and surveillance. It also facilitates the utilization of airspace for launching satellites and developing space programs, highlighting the interplay between air sovereignty and technological advancement.

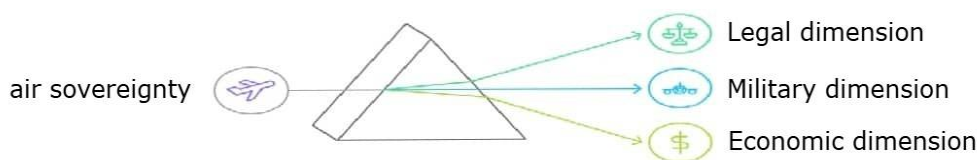


Figure designed by researcher

Figure (01) Dimensions of Air Sovereignty

This figure (not included here) visually represents the multi-dimensional aspects of air sovereignty, encompassing legal, military, economic, political, humanitarian, and technological dimensions. Each of these highlights the significance of air sovereignty in safeguarding national interests and ensuring a state's comprehensive development.

Thus, air sovereignty is not just a theoretical concept, but a practical tool that contributes to national security protection and development enhancement in a rapidly changing world full of challenges. Air sovereignty is also key to achieving a balance between national sovereignty and the requirements of international cooperation, making it a strategic focal point for countries at all levels. Its significance lies in representing the state's sovereign right to manage its airspace and control all activities conducted within it, whether civil or military (Brisibe, 2024).

Axis 2: Contemporary Security Challenges to Air Sovereignty

Air sovereignty is a central element in safeguarding national security and controlling a nation's airspace. With the advancement of modern technology, air sovereignty is facing new and complex threats that require advanced defensive strategies. These include rapid technological developments, such as the use of drones and intercontinental missiles, escalating international conflicts, and evolving patterns of security threats like cyber threats. All of these challenges place enormous pressure on countries to maintain control over their airspace and ensure its security, making air sovereignty vital for the sustainability of national sovereignty and the guarantee of national security. Below is a comprehensive review of the most significant of these challenges:

First: The Rise of Unconventional Threats

In the modern era, unconventional threats have become a significant challenge to both national and international security, as conflicts have expanded beyond traditional warfare into new and complex domains. These threats include cyberattacks targeting critical infrastructure, such as energy systems and navigation, drones used for surveillance and precise airstrikes at low costs, and intercontinental ballistic missiles with nuclear capabilities, which increase the risk of strategic escalation. These threats can be summarized as follows (Franklin, 2008):

• Cyber Threats: A Technological and Informational Challenge

Cyberattacks target digital systems used in air traffic control, radar systems, air defense networks, and even military communication networks. These attacks are carried out by hackers, often state-sponsored or non-governmental groups, and aim to disrupt both civil and military aviation by infiltrating air traffic management systems. Such attacks can also be used to conceal enemy aircraft or disable early detection systems. The ability to control civil or military aircraft through the hacking of control systems poses a significant risk. Real-world examples of cyberattacks include the 2018

attack on Atlanta's Hartsfield-Jackson Airport, which caused a complete disruption of air traffic, and the 2021 cyberattacks targeting air traffic management systems in Ukraine, which compromised the country's readiness for air defense.

Multidimensional Threats of Drones: Unmanned aerial vehicles (UAVs), or drones, have become a primary tool in modern airstrikes. They are notable for their maneuverability, small size, and low cost. These characteristics make them particularly dangerous as they may be used illegally by terrorist groups to target both civilian and military objectives. Drones are also employed for espionage and surveillance, providing an effective means of gathering intelligence on military sites or the airspace borders of states. The main challenges posed by drones to air sovereignty are as follows (Hildreth, 2009):

- **Electronic Jamming:** Drones can be used to jam or destroy air defense systems through electronic warfare.
- **Difficulty in Detection:** Small, lightweight drones may evade detection by traditional radar systems.
- **Low Cost:** The ease of obtaining drones makes them accessible to terrorist groups.

Notable examples of drone-related threats include the 2019 drone attack on Saudi Aramco facilities, which caused significant economic losses, and the use of drones by terrorist groups in Iraq and Syria to target both military and civilian sites.

Long-Term Strategic Threat of Intercontinental Ballistic Missiles (ICBMs): ICBMs are long-range missiles capable of carrying conventional or nuclear warheads. They represent a serious threat to nations due to their ability to bypass traditional airspace boundaries and reach deep into the targeted country's territory. Key threats posed by ICBMs include:

- **Hypersonic Speed:** These missiles can reach their targets at incredibly high speeds, making interception a significant challenge.
- **High Accuracy:** Technological advances have made ICBMs more accurate and effective in striking strategic targets.
- **Nuclear Threat:** Many ICBMs are designed to carry nuclear warheads, amplifying their threat, especially given the current global situation involving countries such as Iran, Syria, and Pakistan, which are seen as potentially unstable. The main challenges air sovereignty faces in dealing with ICBMs include:
- **Missile Defense Systems:** States need advanced missile defense systems, such as THAAD (Terminal High Altitude Area Defense) and Patriot, to intercept ICBMs.
- **Identifying the Source of the Threat:** It may be difficult to pinpoint the responsible state for launching an ICBM, especially if camouflage technologies are used.
- **High Costs:** Developing air defense systems capable of defending against ICBMs is an expensive endeavor and represents a significant economic burden.
- **Examples of Threats from Intercontinental Ballistic Missiles (ICBMs):** North Korea's repeated ICBM tests raise global concerns and threaten regional security. Tensions between the United States and Russia over the development and deployment of new ballistic missile systems further highlight this issue.

Second: Regional and International Conflicts

- **Border Disputes:** Disputes over land and air borders between nations often translate into breaches of air sovereignty. Such violations can escalate tensions or lead to armed conflicts.
- **Air Interventions in Conflicts:** In the context of regional conflicts, airstrikes are used as a military intervention tool, threatening the air sovereignty of neighboring countries and exacerbating security crises.

Third: Economic and Infrastructure Challenges

- **Growth in Civil Aviation Traffic:** With the increase in civil aviation traffic, countries face the challenge of managing air traffic efficiently and safely, while ensuring that air sovereignty is not compromised.

- **Cost of Air Defense:** Maintaining effective air sovereignty requires significant investments in air defense systems, fighter jets, and technological infrastructure. The challenge lies in balancing these enormous costs with other economic needs.

Fourth: Challenges of International Cooperation and National Sovereignty

- **International Airspace Agreements:** As part of international cooperation, countries may relinquish some of their air sovereignty rights to regulate global aviation. This creates a conflict between full sovereignty and international obligations.
- **Military Alliances and Foreign Interventions:** Countries may face difficulties enforcing their air sovereignty when they become arenas for foreign military movements or maneuvers under international agreements or military alliances.

Fifth: Climate Change and Natural Threats

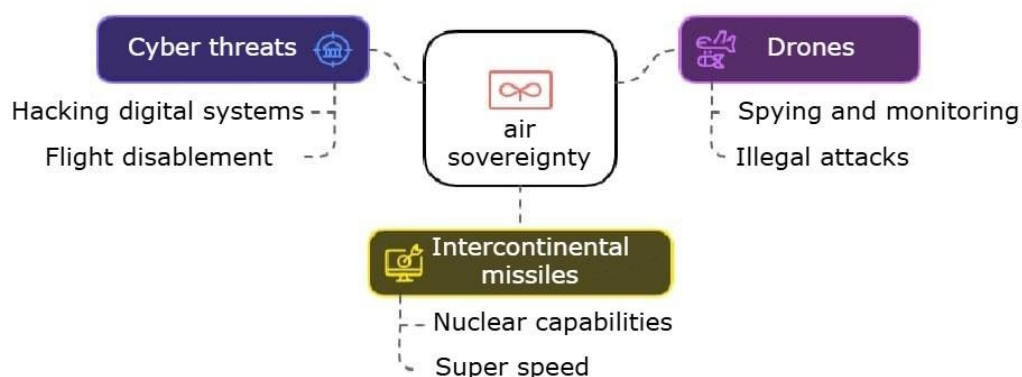
- **Impact of Natural Disasters:** Hurricanes and storms affect airspace monitoring and air defense systems, requiring countries to handle these natural challenges while ensuring the security of their airspace.
- **Changes in Flight Patterns Due to Weather Conditions:** Global weather changes may necessitate restructuring flight routes, which could impact the management of airspace.

Sixth: International Law and Sovereignty Ambitions

- **Legal Ambiguities Regarding Military Uses of Airspace:** There is a lack of clear international legal frameworks regulating the use of drones or space-based laser weapons, creating legal challenges for countries seeking to protect their air sovereignty.
- **Conflict Between Air Sovereignty and the Open Skies Principle:** Regulating international and commercial airspace requires certain compromises by countries regarding their sovereignty, leading to tensions between sovereign rights and economic and diplomatic interests.
- **Seventh: Future Challenges with Technological Advancement**
- **Use of Artificial Intelligence in Airstrikes:** Autonomous drone systems supported by artificial intelligence present new challenges. These systems can make offensive decisions without human intervention, making it difficult to pinpoint the source of the threat.
- **Threats from Non-Governmental Entities:** Terrorist groups or insurgents can use modern technology to challenge the air sovereignty of states, such as targeting aircraft or air facilities.

Figure No. (02) Represents Contemporary Security Challenges to Air Sovereignty

Figure
Design:



Researcher's Own Work

Thus, air sovereignty faces unprecedented challenges that require innovative and integrated strategies combining technological advancement, international cooperation, and the strengthening of defense capabilities. Achieving full control over airspace necessitates those countries confront these challenges with a strategic vision that takes into account military, legal, and economic dimensions to ensure the protection of national security and achieve sustainable stability.

Third Axis: The Role of Technology in Addressing Challenges

Technology plays a pivotal role in addressing the complex challenges facing air sovereignty. It enables countries to develop innovative solutions to enhance their defensive and offensive capabilities and keep pace with rapid developments. Some of the key roles of technology include:

First: Development of Advanced Defensive Systems

• Radar and Early Warning Systems:

Advanced radar and sensing systems enable countries to detect aerial targets, including drones and ballistic missiles, before they enter national airspace.

- **Counter-Drone Systems:** Drones present a growing threat, especially in unconventional conflicts. Technology is advancing counter-drone systems, including electronic jamming or laser-based methods to neutralize them.

Second: Enhancing Offensive Air Capabilities

- **Advanced Fighters:** The use of fifth and sixth-generation aircraft, such as the F-35, provides exceptional offensive and defensive capabilities thanks to stealth technology and artificial intelligence.
- **Precision-Guided Weapons:** Technology enables the development of smart munitions that accurately target threats, minimizing collateral damage.

Third: Cyber Integration and Airspace Protection

- **Cyber Warfare:** Countries face electronic threats targeting air control systems and airport infrastructure. Technology is strengthening cybersecurity defenses to secure these systems against attacks.

Artificial Intelligence in Security Analysis: Using AI to analyze aerial data and potential threats accelerates decision-making for effective and timely actions.

Fourth: Airspace Monitoring and Management

- **Satellites:** Satellites are used to monitor air activities and detect cross-border threats, contributing to enhanced rapid response capabilities.
- **Intelligent Air Traffic Control Systems:** Technology is used to manage air traffic more efficiently, reducing risks and enhancing air security.

Fifth: Development of Air Infrastructure • **Smart Airports:** Technology contributes to the development of automated airports equipped with advanced security systems, minimizing the likelihood of breaches. • **Unmanned Aerial Systems:** Used for monitoring air borders and detecting illegal activities such as smuggling or infiltration.

Sixth: International Cooperation and Technological Integration • **Intelligence Sharing:** Technology facilitates the exchange of intelligence data between countries to enhance their ability to address common threats. • **Virtual Training and Simulations:** Virtual systems can be used to train pilots and military personnel to handle new challenges without risking real-life scenarios.

Figure No. (03) Represents the role of technology in addressing challenges



Figure prepared by the researcher

Thus, technology plays an indispensable role in facing the growing challenges of air sovereignty, as it enhances the ability to detect threats, improve deterrence and defense, and effectively counter potential attacks. As technology continues to evolve, investing in research and development becomes increasingly important to ensure the sustainability of air superiority and the protection of national security.

Fourth Axis: Mechanisms for International Cooperation to Strengthen Air Sovereignty

Strengthening air sovereignty in an interconnected world presents complex challenges that require sustainable and comprehensive international cooperation. International cooperation includes collective efforts to develop common policies, enhance understanding between nations, and address threats that transcend national borders. The increasing challenges include cross-border terrorism, cyberattacks, and illegal unmanned aerial systems (UAS), which require a unified and coordinated response at both regional and global levels (Venier & Pascal, 2004).

First: International and Regional Agreements • Open Skies Treaty: These treaties allow member states to monitor each other's air activities through reconnaissance flights to build trust and prevent hostile activities. • Chicago Convention on International Civil Aviation (1944): It provides a legal framework to ensure air security and regulate air transport between countries, serving as a key reference for enhancing aviation safety.

Second: International and Regional Organizations • International Civil Aviation Organization (ICAO): Plays a pivotal role in setting international standards for air security, such as improving civil aviation safety and protecting airspace from terrorist threats. • NATO: Provides logistical and military support for coordinating air defense operations between member states and addressing shared threats.

Third: Intelligence Sharing • International Information Exchange Networks: Countries share intelligence data on illegal air activities, such as arms smuggling or unauthorized aircraft movements. • Regional Air Surveillance Centers: Specialized monitoring centers are established to track and follow common aerial threats.

Fourth: Joint Training and Exercises • Joint Air Defense Drills: Countries organize joint military maneuvers to improve operational coordination, such as NATO exercises or "Red Flag" drills, which bring allies together to develop air defense and attack capabilities. • Cyberattack

Simulations: Exercises include scenarios to counter cyberattacks targeting aviation systems, enhancing the ability to respond collectively.

Fifth: Research and Development Cooperation • Development of Joint Technologies: Countries collaborate on developing radar systems, drone countermeasures, and advanced air defense technologies, as seen in the European Union's collaboration in projects like the European Air Traffic Management System. • Artificial Intelligence and Cloud Computing: AI is used to analyze aerial data, while cloud computing facilitates faster and more efficient information exchange between countries.

Sixth: Legal and Diplomatic Efforts

Coordination in International Law: New laws are being developed to address the challenges posed by drones, cyberattacks, and other emerging aerial threats. • Mechanisms for International Mediation: Mediation is used to resolve disputes related to violations of air sovereignty or disagreements over airspace management between nations.

Sixth: Addressing Cyber Threats and Non-Governmental Groups • International Cybersecurity Frameworks: Cooperation between countries to create secure cyber networks, reducing the likelihood of breaches in air traffic control systems. • Combating Aerial Terrorism: Information is shared regarding the activities of transnational terrorist groups, and proactive measures are taken to prevent their use of drones or commercial aircraft.

Seventh: Air Crisis and Disaster Management • Rapid Response Teams: International teams are created to respond promptly to aerial crises, such as plane crashes or counteracting terrorist attacks. • Technical Assistance: More advanced countries provide technical support to developing nations to modernize air traffic control systems and improve infrastructure.

Eighth: Challenges Facing International Cooperation

1. **Differences in Sovereign Interests:** Some countries may resist cooperation for fear of undermining their national sovereignty.
2. **Lack of Funding:** Implementing advanced cooperation mechanisms requires significant funding, which may not be available in developing nations.
3. **Rapid Technological Advancements:** The fast pace of technological progress makes it difficult for legal and cooperative frameworks to keep up.

Figure No. (04) Represents International Cooperation for Air Sovereignty



The figure is designed by the researcher.

Therefore, international cooperation mechanisms are essential for safeguarding air sovereignty against contemporary and growing challenges. Cooperation in areas such as information sharing,

technological development, joint training, and the establishment of international legal frameworks enhances the ability of nations to protect their airspace. However, the success of these mechanisms requires strong political commitment, sustainable investments, and effective coordination among all international parties (Walowski).

Conclusion

In conclusion, it can be said that the security challenges facing air sovereignty have become more complex in light of the rapid changes occurring in the world, whether in terms of technological development or the rise of unconventional threats. From drones to cyberattacks, from intercontinental missiles to regional conflicts, protecting air sovereignty requires efforts that go beyond traditional solutions and necessitate integration between national capabilities and international cooperation.

Addressing these challenges requires a comprehensive approach, including the development of defense technologies, strengthening international policies, and providing a flexible legal framework that keeps pace with current changes. Thus, air sovereignty is an integral part of global stability, which relies on cooperation between countries and the activation of joint mechanisms to confront transnational threats.

In this context, effective safeguarding of air sovereignty is an imperative necessity to maintain security and stability. This demands that countries work together and develop proactive strategies capable of adapting to future challenges. Air sovereignty is not merely about controlling airspace, but it is a shared responsibility to protect global peace and security. Based on the above, the following conclusions and recommendations can be drawn:

First: Conclusions

1. Technological development increases the complexity of air security challenges.
2. Relying solely on traditional systems is no longer sufficient to protect air sovereignty.
3. International cooperation plays a critical role in addressing security threats.
4. There is a need to strengthen national and international legal frameworks to ensure the security of airspace.

Second: Recommendations

1. Develop advanced defense systems based on artificial intelligence and technological innovation.
2. Strengthen international cooperation through agreements and partnerships in the field of air security.
3. Establish mechanisms for precise monitoring and surveillance of unlawful activities in airspace.
4. Provide specialized training for security and defense forces to counter modern threats.
5. Update national legislation to align with emerging challenges in air sovereignty.

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