‘UAVs’ STRATEGIES: THE EMPLOYMENT OF DRONES BY REGIONAL POWERS AND VIOLENT NON-STATE ACTORS IN THE MIDDLE EAST CONFLICTS

BY

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DECLARATION

“I do hereby attest that I am the sole author of this thesis and that its contents are only the result of the readings and research I have done”.

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Abbreviations

VNSA - VNSAs	**Violent Non-State Actors**
GCC	**Gulf Cooperation Council**
UAV	**An unmanned aerial vehicle**
Drone	**Aircraft Without a Human Operator on Board**
RPV'	**Remotely Piloted Vehicle**
UACV	**Unmanned Aerial Combat Vehicle**
ISTR	**Intelligence, Surveillance, Targeting and Reconnaissance**
GNA	**Libyan Government of National Accord**
LNA	**Libyan National Army**
CAT	**the Conventional Arms Transfer**
MTCR	**the International Missile Technology Control Regime**
ITAR	**the International Traffic in Arms Regulations**
ANSA	**Armed Non-State Actor**
R&D	**Research and Development**
IS	**Islamic State**

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ABSTRACT

The research aims to study the impact of military drones' usage on regional power conflicts in the Middle East. Drones have become an increasingly prevalent tool for military operations in the region, and their widespread deployment has raised concerns regarding their influence on power dynamics and conflict outcomes. This research seeks to shed light on how these technological advancements shape the regional balance of power and security.

The study will analyse the ways in which drone technology has affected power dynamics between state and violent non-state actors (VNSA) in the region. It will evaluate how drones have influenced military strategies, deterrence policies, and threat perceptions in the Middle East.

The research seeks to advance our understanding of the complex relationship between military drone use and regional power conflicts in the Middle East. Through rigorous analysis of case studies and empirical data, the research aims to contribute to the existing literature on conflict studies, technology, and international security, while providing actionable insights for addressing the challenges posed by the proliferation of drones in the region.

Limitations to the study of the impact of military drone use on regional power conflict in the Middle East include potential data accessibility challenges due to the sensitivity and secrecy surrounding drone operations, particularly for classified missions. Additionally, the complexity of regional conflicts and the multitude of factors influencing power dynamics may make it difficult to isolate the precise effects of drone usage.

CHAPTER I: INTRODUCTION

1.1. BACKGROUND

The past few years have witnessed a large presence of drones. As a qualitative new weapon that has been employed heavily; militarily, security and logistically, to become a milestone in the transformations of regional conflicts in the Middle East. Drones have become the most prominent weapon in power conflict in the Middle East by state actors and their proxies such as militias, armed organizations (ideological and non-ideological), mercenary groups, paramilitary tribal formations, etc, in the regional hotspots, such as Yemen, Libya, Syria, Iraq, and others.

On the other hand, what can be called "drones' economies" has become an important factor in the regional conflicts in the Middle East, with the multiplicity of manufacturers, supporters, producers, and exporters of drones, which have become a hidden weapon for killing and a crucial tool for espionage and military and logistical actions at the main conflict points in the Middle East region particularly.

Drones have also become a vital and decisive element in the strategies of the competing powers over regional sovereignty in the Middle East. Iran, Turkey, and Israel. It is a fierce competition whose battles are taking place in the field of the Middle East region, which has become the site of interactions, wars and conflicts of those powers. The drones made the conflict between those forces indirect. With the replacement of the direct conflict by another indirect conflict that includes an increasing race to possess and manufacture drones, which are light in weight and price, heavy in impact and effectiveness, as its strategic importance has been increasing day by day.

As a case study, the Iranian strategy in the Middle East can be considered an appropriate analytical tool to study the role of drones in regional conflicts, in light of Iran's vision of its location and leadership role in the region, and the consideration of the Middle East as the most vital field for achieving Iranian national interests.

The alliances that Iran establishes with violent non-state actors (VNSA) in the Middle East is one of the most important issues through which drones' strategies are employed to achieve Iranian political goals in the region. With the change in the methodological view of this type of non-state actors in the literature of international relations, which traditionally viewed the state as the dominant actor in all international interactions, and that other players are only marginal or secondary actors, revolving in the orbit of the state.

If some researchers describe global politics in the twenty-first century as a stage in which the state is no longer the sole actor, it can be said that the stage of regional politics in the Middle East has become non-state actors who constitute the most prominent actor in drawing its map, patterns, interactions and alliances on the political, economic and even military levels, especially with the emergence of violent non-state actors (VNSA) and its remarkable increase in its role in the region, as one of the manifestations of international interactions in the new millennium.

1.2. PROBLEM STATEMENT

We can consider the main problem of the study is the analysis of the drones role in the Middle East conflicts, especially between the major powers in the region, Turkey, Israel and Iran, with a study of the Iran case, by analyzing the roles of Tehran's regional agents of the

type of violent non-state actors (VNSA) and their position in the Iranian strategy towards the Middle East region, with a focus on the Houthis in Yemen and Hizballah in Lebanon.

1.3. RESEARCH QUESTIONS

The main research problem of the study raises several sub-questions, the study seeks to find answers for them to complete the answer to the main problem under study. The most prominent of these questions are the following:

- **Q.1.** How do regional powers in the Middle East use drones to achieve their strategic goals?
- **Q.2.** What are the economics of drones in the Middle East?
- **Q.3.** What is the definition of a violent non-state actor (VNSA)?
- **Q.4.** How do violent non-state actors (VNSA) in the Middle East use drones to achieve their goals?
- **Q.5.** What is the place of violent non-state actors in 'UAVs' Strategies in the Middle East?
- **Q.6.** What are the most prominent powers controlling the drones market in the Middle East?
- **Q.7.** Can drones be used for peace and development purposes instead of war and conflict?

1.4. RESEARCH OBJECTIVES

The study seeks to achieve several research objectives, as follows:

- To Compare the military employment of drones with the strategies of regional powers in the Middle East.
- To study the military employment of drones by violent non-state actors (VNSA) in the Middle East.
- To study the economic dimensions of manufacturing and possessing drones in the Middle East.
- To Analyze the escalating roles of violent non-state actors in Middle Eastern conflicts.
- To Study the position of violent non-state actors in the Iranian strategy in the Middle East.
- To Analyze the uses of drones by Iran's regional proxies in major regional conflict areas.
- To Shed light on the non-military uses of drones in international experiences.

1.5. RESEARCH SIGNIFICANCE

The Middle East is a region historically known for its complex geopolitical landscape and simmering conflicts. In recent years, the use of drones by regional powers has emerged as a significant factor that has the potential to shape the dynamics of power, security, and warfare in the area. Understanding the importance of studying the use of drones by regional powers in the Middle East is crucial for comprehending the implications on regional stability, international relations, and the future of warfare. This research discusses the multifaceted significance of delving into this subject.

The Middle East is characterized by intense competition among regional powers seeking to assert their influence and dominance in the region. The use of drones has become an important component of military strategies for these countries. Studying how regional powers employ drones allows us to gain insights into their military capabilities, priorities, and long-term objectives. This knowledge is essential for understanding the changing dynamics of power in the Middle East and the potential risks and opportunities that arise from this competition.

The use of drones by regional powers can significantly impact regional security dynamics. Armed drones, surveillance drones, and reconnaissance drones are employed for various purposes, ranging from border surveillance and intelligence gathering to targeted strikes. Analyzing the implications of drones' usage on regional security can shed light on the potential risks of escalation, as well as identify areas for confidence-building measures and cooperation. It also helps to assess the effectiveness of drone deployments in countering common security threats such as terrorism and insurgencies.

The use of drones in the Middle East has necessitated the development of new military tactics and strategies by regional powers. The ability to carry out precision strikes from remote locations has changed the nature of warfare and affected traditional military doctrines. By studying the use of drones by regional powers, military analysts can understand the evolution of these tactics and how they may influence future conflicts. Armed with this knowledge, countries can adapt their defense policies to effectively respond to emerging threats.

The use of drones by regional powers has implications not only within the Middle East but also for international relations. Drone strikes in neighboring countries can raise concerns over sovereignty violations and lead to diplomatic tensions. Understanding how the use of drones

impacts regional diplomacy can guide international actors in promoting peaceful resolutions and de-escalation mechanisms. Moreover, the study of drone usage can aid in formulating international norms and regulations governing the responsible use of this technology.

Drones' ability to conduct targeted strikes raises ethical and humanitarian concerns, particularly when it comes to civilian casualties and human rights violations. By studying the use of drones by regional powers in the Middle East, we can critically examine the adherence to international humanitarian law and the ethical implications of drones' warfare. This understanding is essential for holding accountable those responsible for potential violations and advocating for more ethical and responsible drones' operations.

The Middle East's engagement with drone technology provides insights into the region's technological capabilities and innovation potential. Regional powers' investments in drone development and usage reflect their commitment to modernizing their militaries and harnessing emerging technologies. By studying this aspect, countries can identify areas for collaboration, technology transfer, and capacity-building to promote regional stability and economic growth.

The study of the use of drones by regional powers in the Middle East is of utmost importance due to its far-reaching implications on regional security, military strategies, and international relations. Understanding how drones are employed in the region helps in assessing the changing dynamics of power and competition among regional players. Moreover, it allows for a critical examination of the ethical and humanitarian considerations related to drone usage and helps in shaping international norms and regulations. As drone technology continues to evolve, the knowledge gained from studying its use in the Middle East can

inform decision-making, foster cooperation, and contribute to a more stable and secure region.

1.6. RESEARCH TIME PERIOD

The study focuses on the period 2013-2023 to examine the phenomenon of escalating military employment of drones in Middle East conflicts. The period from 2013 to 2023 witnessed a significant escalation in the phenomenon of military uses of drones in the Middle East. This decade is of paramount importance for studying the evolution of drone warfare in the region due to several factors. The advancement in drone technology, the emergence of non-state actors, geopolitical shifts, and the changing nature of warfare have all played pivotal roles in shaping the course of drone usage during this period.

- **Technological Advancements:** The decade from 2013 to 2023 witnessed remarkable strides in drones' technology. Both state and non-state actors leveraged these advancements to enhance their capabilities and conduct military operations more efficiently. Notably, there was a proliferation of armed drones, capable of carrying out precision strikes, reconnaissance, and surveillance. This technological leap allowed actors to project power without significant risks to their personnel, leading to an increase in drone deployment in conflicts across the Middle East.
- **The Rise of Non-State Actors:** A defining feature of the Middle East during this period was the emergence and growth of violent non-state actors (VNSA), particularly extremist groups and militias. Organizations like ISIS, Al-Qaeda affiliates, Hizballah, and Houthi rebels gained prominence and posed new challenges for regional stability. These groups exploited the accessibility of drone technology, employing drones to

launch attacks, gather intelligence, and carry out propaganda campaigns. Their use of drones in asymmetric warfare added a complex dimension to regional security.

- **Geopolitical Tensions and Proxy Conflicts:** The Middle East has been a hotbed of geopolitical tensions and proxy conflicts for decades. During the chosen period, these conflicts intensified, with major powers supporting rival factions, leading to a surge in drone usage. Nations like Iran, Israel, and Turkey, among others, increasingly relied on drones to gain an advantage over their adversaries, often operating in contested airspace. The influx of drones into these conflicts highlighted how the technology offered an effective and low-cost means of exerting influence in regional power struggles.
- **Changing Nature of Warfare:** The decade from 2013 to 2023 witnessed a transformation in the nature of warfare. Traditional state-on-state conflicts increasingly gave way to hybrid warfare, where conventional forces and irregular tactics were combined. Drones became a key tool in this evolving landscape, serving both state and violent non-state actors alike. Moreover, the use of drones blurred the lines between military and civilian spaces, raising ethical concerns and impacting civilian populations in conflict zones.
- **Impact on Regional Security and Stability:** The proliferation of military drones in the Middle East had profound implications for regional security and stability. While drones offered the advantage of reducing the risk to human lives, their use also led to an increase in airstrikes and targeted killings. This, in turn, fueled cycles of violence and retaliatory actions. Furthermore, the indiscriminate use of armed drones raised questions about accountability and adherence to international humanitarian law, creating challenges for conflict resolution and post-conflict reconstruction.

- **Implications for International Relations:** The escalation of drones use in the Middle East influenced international relations during the selected period. Countries outside the region, such as the United States, Russia, and China, played an active role in supplying drone technology and providing military assistance to their regional allies. The involvement of foreign powers in regional conflicts heightened tensions and complicated efforts towards peaceful resolution.

1.7. RESEARCH REFERANCES

The research based on an extensive review of academic literature, policy documents, and expert analyses related to military drone technology and its applications in the Middle East. This step will establish a solid theoretical framework and identify key themes and areas for investigation. The study will build upon a diverse range of academic literature in the fields of conflict studies, international relations, military studies, and technology. Existing research on drone warfare, the Middle East's security landscape, and power dynamics in the region will provide essential context and support for the study's findings. Noteworthy authors and studies from reputable journals and publications will be utilized to ensure the credibility and rigor of the research.

1.8. RESEARCH LIMITATIONS

Studying the escalation of military uses of drones in the Middle East is a complex endeavor that comes with various limitations. While research in this field provides valuable insights into the changing dynamics of warfare and the impact of drone technology, it is essential to recognize and address these limitations to ensure the accuracy and validity of findings. Here are some of the key limitations:

- **Lack of Comprehensive Data:** Obtaining comprehensive and reliable data on drone operations in the Middle East can be challenging. Many drone programs, especially those conducted by secretive intelligence agencies, are not transparent, and the information available to the public may be limited or heavily redacted. This lack of data can hinder researchers from conducting a comprehensive analysis of drone usage and its implications.
- **Rapidly Changing Technology:** Drone technology is evolving rapidly, and studies conducted over an extended period may become outdated quickly. New advancements in drone capabilities and tactics could significantly alter the nature of drone warfare, making it challenging to draw definitive conclusions from historical data.
- **Access to Conflict Zones:** The Middle East has been marred by numerous conflicts and security challenges. Accessing conflict zones for firsthand observation and data collection can be extremely difficult due to safety concerns and political restrictions. Researchers may have to rely on secondhand accounts, media reports, and official statements, which may not always provide a complete or accurate picture.
- **Attribution Issues:** In conflicts involving multiple state and non-state actors, attributing drone strikes to specific parties accurately can be problematic. Various actors may use similar drone technology, leading to confusion about responsibility for particular actions.
- **Ethical Concerns:** The study of military uses of drones raises ethical considerations. Drones have been associated with civilian casualties, and the ethical implications of targeted killings and remote warfare must be carefully examined. Researchers may face challenges in reconciling the necessity of studying these topics with the potential harm or distress caused to affected communities.

- **Contextual Complexity:** The Middle East is a region characterized by intricate political, social, and religious dynamics. Drone usage must be studied within the context of broader geopolitical and cultural factors. Failure to account for these complexities may result in oversimplified or biased conclusions.
- **Propaganda and Misinformation:** In conflict zones, parties involved often engage in propaganda and misinformation campaigns to shape public perception and influence international opinion. Researchers must critically evaluate sources to avoid relying on biased or false information.
- **Difficulty in Assessing Long-term Impact:** Understanding the long-term consequences of drone usage in the Middle East may prove challenging due to the multifaceted nature of conflict and the complexities of measuring social, political, and psychological impacts over extended periods.
- **Generalizability to Other Regions:** The Middle East is not the only region where drones are deployed for military purposes. Research conducted exclusively in this context may not be directly applicable to other areas with different political, cultural, and conflict dynamics.

Despite these limitations, studying the escalation of military uses of drones in the Middle East remains critical for comprehending the changing nature of warfare and its implications for regional and global security. Researchers must approach this subject with transparency, ethical consideration, and a commitment to acknowledging the complexities and uncertainties that come with studying conflicts and emerging technologies. Through interdisciplinary collaboration and robust research methodologies, scholars can work towards generating

meaningful insights and informing policy discussions surrounding drone warfare in the Middle East and beyond.

CHAPTER 2: THEORITICAL FRAMEWORK

2.1. INTRODUCTION

The increasing adoption of drone technology has brought significant changes to modern warfare and has particularly influenced regional power dynamics in the Middle East. This study aims to investigate the impact of military drone usage on power struggles within the region. The theoretical framework, methodology, and key concepts presented here will provide a comprehensive foundation for conducting this research.

The theoretical framework outlined here, combined with the chosen methodology and key concepts, will enable a comprehensive examination of the impact of military drone usage on regional power struggles in the Middle East. By analyzing the realist, constructivist, and securitization perspectives, this study will contribute valuable insights to the evolving field of international relations and shed light on the implications of drone warfare in the context of the Middle East's complex political landscape.

Methodology and concepts are foundational elements in research that play a pivotal role in ensuring the credibility, validity, and relevance of the findings. They provide a structured framework for conducting investigations, guiding researchers through the entire research process. The importance of methodology and concepts in research can be summarized as follows:

A well-defined methodology outlines the step-by-step procedures that researchers follow during data collection, analysis, and interpretation. This systematic approach enhances the reliability and replicability of the study, allowing other researchers to verify and build upon the results.

An appropriate methodology ensures that the research is designed to address the research questions accurately and effectively. Concepts are the building blocks of theories and explanations, and using relevant concepts allows researchers to investigate and interpret phenomena in a meaningful way, ensuring the validity and credibility of the study.

Methodology and concepts help researchers clarify the scope and objectives of their study. A well-defined research design and clear concepts enable the researcher to remain focused on the specific research questions, avoiding unnecessary deviations and maintaining coherence throughout the study.

A robust methodology incorporates ethical considerations, ensuring that the research is conducted with integrity and respect for participants' rights. Concepts also assist in framing research questions in an ethical manner, considering the potential impact on individuals and communities.

A well-described methodology enhances the potential for replicating the study in different contexts, reinforcing the robustness of the findings. Concepts that are clearly defined and widely accepted facilitate the generalization of research findings to other populations or settings.

The choice of methodology and concepts influences the scope and novelty of the research. Exploring innovative methodologies or applying existing concepts in novel ways can lead to groundbreaking insights and contribute to the advancement of knowledge in the field.

2.2. RESEARCH CONSEPTS

The introduction of research concepts sets the stage for a comprehensive and focused investigation. Research concepts are fundamental ideas, theories, or constructs that guide researchers in understanding, exploring, and explaining phenomena under study. By introducing key concepts at the beginning of a research study, the researcher establishes a common language and framework for the readers or audience to follow the inquiry.

The introduction of research concepts serves several purposes. It provides clarity on the terminology and theoretical underpinnings of the research, helping readers grasp the context and significance of the study. Moreover, it highlights the gaps in existing knowledge that the research aims to address and explains why these concepts are relevant to the research problem. By laying the groundwork with well-defined concepts, the researcher ensures a coherent and logical progression throughout the study, leading to meaningful and impactful conclusions.

2.2.1. FOREIGN POLICY

There is a fact known to researchers in the field of international relations that there is no agreement between the theorists of the field regarding the definition of foreign policy, as there are many definitions regarding the concept, some of which are very general and broad, while others are very specific. In this context, several of the most prominent definitions of foreign policy can be addressed, according to several of the field's most prominent scholars and theorists.

Some Researchers believe that foreign policy is “all forms of external activity, even if it does not emanate from the state as a systemic fact. While Paul Seabury considers foreign policy to be “a set of goals and connections through which the state tries, through the constitutionally

defined powers, to deal with foreign countries and the problems of the international environment by using influence, force, and sometimes even violence"[1].

Between these two definitions, the first broad, and the second specific, James Rosenau believes that foreign policy is "a method of action that official representatives of the national community consciously follow in order to approve or change a specific position in the international system in a manner consistent with predetermined goals"[2].

While Christopher Hill views foreign policy as "a purposeful action stemming from a vision, in order to promote the interests of one political unit"[3]. According to previous trends, we can define "foreign policy" as "the public action program chosen by the official representatives of the international unit, from among the group of alternatives available programs, in order to achieve specific goals in the external environment.

2.2.2. THE MIDDLE EAST

The Middle East region refers to countries around the Arabian Gulf region; it spans majorly from Western Asia toward Northern Africa to Egypt and Sudan. The region has over 18 countries, of which the majority belong to the Arabian nations league and are Muslims by religion. Among nations in the Middle East are Saudi Arabia, UAE, Iraq, Iran, Egypt, Turkey, Yemen, Kuwait, Oman, Afghanistan, etc. The region, which is relatively characterized by the high level of conflicts, wars, political instabilities, ranging from the Israeli- Arab conflict, Taliban-US wars, ISIS terrorism, Syria war, several assassination

[1] Paul Seabury, **Power, Freedom and Diplomacy: The Foreign Policy of the United State**, New York, Random House, Vintage, 1965, p. 7.

[2] James Rosenau, "Moral Ferver, Systemic Analysis, and Scientific Conciouness in Foreign Policy Research" in, Austin Ranny, (ed), **Political Science and Public Policy**, Chicago, Markham, 1968, p. 222.

[3] Christopher Hill, **The Changing Politics of Foreign Policy**, Palgrave Macmillan, 2002, p. 285.

attempts, various suicide bombings, etc. Hence, the alert (security awareness) and the security risk around the region cannot be overemphasized. The study will be focusing on the application of drones in the operation, revealing where the technology (UAV device) has impacted positively and where it has impacted negatively in the Middle East and used by state and non-state actors[1].

2.2.3. REGIONAL POWER

Although the concept of regional power is frequently used in International Relations (IR) literature, there is no consensus regarding the defining characteristics of a regional power[2].

While the term 'regional (great) powers' is widely used and relatively uncontested, the salient features and the constitutive character of these countries is still debated. Among the few aspects concerning regional powers which seem to be uncontested in the literature are the following assumptions: a) that these states belong to the region considered; b) that they display a superiority in terms of power capabilities, that is, that they possess the largest power share in the region and, c) that they exercise some kind of influence on the region[3].

So, we can consider "Regional Power" as a definition is referring to a state that has dominant military and economic capabilities in the region, is willing to consistently exercise those

[1] Col. KHALIFA HELAL KALIFA ALTENEIJI, **Middle East's drone race, and implication of weaponizations on the security landscape**, Brazilian Army Strategic Studies International, Rio de Janeiro, 2021, p. 11.

[2] Detlef Nolte, How to Compare Regional Powers: Analytical Concepts and Research Topics, **Review of International Studies**, (2010), 36, p. 881.

[3] Sandra Destradi, Regional powers and their strategies: empire, hegemony, and leadership, **GIGA German Institute of Global and Area Studies**, 2010, pp. 904-905.

capabilities in its interactions with other regional members and is recognized by other members of the region as being a regional power[1].

2.2.4. REGIONAL CONFLICT

The concept of regional conflict within the field of international relations refers to a specific type of conflict that occurs within a defined geographical area, typically involving multiple states or non-state actors from the same region. These conflicts are characterized by their localized nature, where the primary actors share geographic proximity, cultural ties, and often overlapping security concerns. The dynamics of regional conflicts are influenced by a complex interplay of historical, political, economic, and social factors, making them distinct from global conflicts that encompass a broader scope. While there is no universally agreed-upon definition, scholars and experts have contributed insights to elucidate the concept.

Some researchers define regional conflicts as "violent interactions between states or non-state actors that occur within a specific geographic area, usually encompassing neighboring or proximate states." This geographical proximity serves as a crucial criterion in distinguishing regional conflicts from those that span across continents. The conflicts often stem from a combination of historical grievances, ethnic or religious tensions, competition for resources, and struggles for influence over a particular territory[2].

Moreover, regional conflicts are subject to both internal and external influences. Internal factors encompass issues such as ethnic rivalries, political instability, and socioeconomic

[1] Cline K., Rhamey P., Henshaw A., Sedziaka A., Aakriti T., Volgy T.J. Identifying Regional Powers and Their Status. **Major Powers and the Quest for Status in International Politics: Global and Regional Perspectives**. Ed. By Volgy T.J., Corbetta R., Grant K.A., Baird R.G. New York, Palgrave MacMillan Publ., 2011. Pp. 133-157.

[2] Stefan Wolff, Oya Dursun-Ozkanca, Regional and International Conflict Regulation: Diplomatic, Economic and Military Interventions, **Civil Wars**, Vol.14, No.3 (September 2012), pp.297–323.

disparities that can contribute to the eruption and escalation of conflicts. External factors include interventions by global powers, international organizations, or neighboring states that can exacerbate or mitigate regional conflicts based on their strategic interests[1].

It is important to note that regional conflicts are not monolithic; they vary in intensity, duration, and the number of actors involved. Some regional conflicts may be characterized by sporadic border skirmishes, while others escalate into full-blown wars with devastating consequences for the affected region and beyond.

Regional conflict formations can be understood as "sets of transnational conflicts that form mutually reinforcing linkages with each other throughout a region, making for more protracted and obdurate conflicts". This analytical category should be understood as distinct from interstate conflicts and intrastate conflicts with multiple parties, nor can it be reduced to situations where there is simply a "spill over" effect from one conflict to another or where there are several essentially autonomous civil wars within a region.

Rather, regional conflict formations are typically characterized by fundamental, interconnected networking and processes within a region: institutional weaknesses of one or more states, regional security competition, a parallel and transnational informal economy, transborder social networks, illegal trafficking and trade, natural resource exploitation, militarization and arms transfers, and rans border armed groups[2].

2.2.5. DRONES

[1] Kenneth N. Waltz, Man, the State and War (New York: Columbia University Press 1959) p. 10.

[2] The Regionalization of Conflict and Intervention, **An International Peace Academy Report**, New York, 2003, P. 2.

An unmanned aerial vehicle ('UAVs') is an aircraft without a human operator on board and is commonly referred to as a 'drone', but also as a remotely piloted vehicle ('RPV'), remotely piloted aircraft ('RPA'), remotely operated aircraft ('ROA') or, in the case of UAVs with specific combat roles, as an unmanned aerial combat vehicle ('UACV'). In contradistinction to conventional aircraft, UAVs are controlled either remotely by human operators or are guided by a computer program with various levels of automation and autonomy.

Among UAVs, there is a high degree of differentiation regarding a vehicle's size, function, capabilities, and expendability. Some are comparable to manned aircraft, while others can be carried and launched by a single person. The international legal significance of UAVs has been debated vigorously in the context of so-called targeted killings but extends to other areas such as providing intelligence, surveillance, targeting and reconnaissance ('ISTR') as well as civil aviation. UAVs generally form part of a system that has additional components such as a flight control station and an information retrieval and processing station[1].

Drones are employed in a variety of capacities and roles by military or violent actors. Accordingly, they exist in a variety of sizes, types, and systems. In its simplest sense, "drone" designates any vehicle which is piloted remotely (and which generally does not make significant autonomous decisions). The distance from which drones can be piloted ranges from a few dozen meters to several thousand kilometers, either through direct telecommunication link or via satellite connection; in some cases, drones can also be preprogrammed to function without communication link. While most drones are aerial

[1] Markus Wagner, Unmanned aerial vehicles, **Max Planck Encyclopedia of Public International Law**, Rüdiger Wolfrum, ed, Oxford University Press, Forthcoming, University of Miami Legal Studies Research Paper, 15-12, 2014.

vehicles, there exist some naval drones (and remote-controlled ground vehicles), and limited evidence suggests non-state actors have experimented with these types too[1].

2.2.6. VIOLENT NON-STATE ACTORS (VNSA)

Violent non-state actors (VNSA), a type of armed, "subnational" actor, can use violence to achieve their goals, whether they use violence or only possess the tools of it as a deterrent. Nor are they formally involved in any of the state institutions that monopolize the tools of armed force, such as the army, police, special forces, and semi-official forces[2].

Violent non-state actors (VNSA) share several distinguishing features, including having goals and motives for the movement, complete independence in funding sources from the central government in which they operate. and have their own resources. Have a distinct identity. Politics independent of the country to which it belongs geographically. It has a specific regulatory framework, domestic or transnational. They also perform functions that substitute for the central government in some or all the country's territory[3].

The pattern of violent non-state actors includes several patterns, the most important of which are Warlords, clan leaders, rebel movements, terrorist organizations, mercenaries, organized crime gangs, and private security companies.

Among the types of violent non-state actors are Islamic organizations, which employ violence in religious contexts. The study focuses on non-state violent actors with political

[1] Yannick Veilleux-Lepage and Emil Archambault, **A Comparative Study of Non-State Violent Drone use in the Middle East**, International Centre for Counter-Terrorism (ICCT), December 2022, p. 8.

[2] Ulrich Schneckener, "Fragile Statehood, Armed Non-State Actors and Security Governance", in: Alan Bryden, Marina Caparini, **Private Actors and Security Governance**, Geneva, Centre for the Democratic Control of Armed Forces DCAF, 2006, p. 25.

[3] Phil Williams, **Violent Non-State Actors and National and International Security**, International Relations, and Security Network (ISN), Zurich, 2008, p. 8.

goals and motives, and the study will not focus on other types, such as mercenaries, organized crime gangs, private security companies, etc.[1].

2.3 RESEARCH APPROACH

The researcher believes that the role approach is an appropriate analytical framework for the main problem and research questions of the study. The role approach in international relations offers a robust framework for studying the impact of drones on conflicts in the Middle East. By focusing on the roles adopted by states, non-state actors, and international organizations, this approach captures the complexities of conflicts in the region, where traditional roles have been reshaped and new roles have emerged due to technological advancements. As drones continue to shape conflict dynamics and geopolitical interactions, the role approach provides a lens through which the intricate interplay of identities, expectations, and behaviors can be understood, contributing to a more comprehensive analysis of the evolving conflicts in the Middle East.

The concept of role is mainly based on the theories of sociology, psychology, and anthropology. The concept was borrowed to political science and international relations, during the second half of the twentieth century, cause of the influence and the efforts of the behaviorist school. With the role approach, the different behaviors and roles that nation-states and other non-states actors play in their external interactions can be known. The role approach or role theory has been used as a cognitive framework for analyzing the foreign policy roles of states.

[1] Katerina Dalacoura, "Islamist Movements as Non-state Actors and their Relevance to International Relations", in: Daphn Josselin and William Wallace (eds.), **Non-State Actors in World Politics**, New York, Palgrave, 2010.

There are many trends regarding the definition of the concept of role among sociologists, and it is possible to distinguish between two main groups of trends, the first of which is Those definitions that focus on the role-player and his expectations, including the definitions of Theodorson and Popitz. The second is those definitions that focus on the role-player and his relationship with others. Perhaps the most important definitions under this sect were given by the most famous sociologist, Talcott Parsons.

According to the first trend, Theodorson goes, that "the role is a model of behavior based on certain rights and duties and linked to a specific position within the scope of a group or social situation. This role is determined by a set of expectations on the part of others and on the part of the person himself about his behavior"[1].

While Popitz believes, "the role is a product of two more comprehensive and broad perceptions, which are social norm and social differentiation, or more precisely as a result of a certain interdependence between both perceptions.

Every society can be considered as a framework of behavioral norms and that certain modes of social action can be permanently and continuously distinguished as forced and binding. Also, each society can be considered as a socially differentiated building and as a composite framework of distinct parts from a social point of view[2].

Kal. J. Holsti, is the most important researchers in the field of international relations, who presented a coherent theoretical framework for the use of the role approach in analyzing political phenomena and foreign policy interactions between states, in his pioneering study,

[1] George A. Theodorson, Achilles G. Theodorson, **A Modern Dictionary of Sociology**, New York ،Thomas Y. Crowell Com., 1969, p. 452.

[2] H. Popitz, **The Concept of Social Role as an Element of Sociological Theory**, Cambridge University Press, 1972, p. 14.

"Perceptions of the National Role in the Study of Foreign Policy", in which he argued that the behavior of the state On the external level, it is determined by the foreign policy maker's perception of the state's roles at the external level, which is determined according to a set of factors and determinants[1].

According to Holsti, each country has a role in the international system, which is one of the features of its foreign policy, and a distinctive sign for it. The external role of any international unit includes three main dimensions, summed up in the foreign policy maker's perception of the state's position in the international system, and his perception, also, of the main motives of the policy. The foreign affairs of his country in its international movements, and the expectations of the decision-maker in the foreign policy of the size of the potential change in the international system as a result of performing his job in the international system[2].

There are four characteristics of the role concept, as an analytical approach, according to Naomi Wish. The first is that the role concept does not only refer to the foreign policy maker's perception of this role but goes beyond that to how he exercises this role in the field of foreign policy, which means harmonization between the perception and behaviour. The second is that the concept of role includes, in addition to the policy maker's perception of the role of his state, his perception of the role of his main enemies in the international system. The third is that the state may play several roles simultaneously in its international

[1] Kal. J. Holsti, "National Role Conceptions in Study of Foreign Policy", **International Studies Quarterly**, 14, No.3, November 1970, pp. 233-309.

[2] **Ibid**, pp. 245-246.

interactions. And the fourth is that it is envisaged that the state will have a role in the international context, different or consistent with another role it has at the regional level[1].

According to these characteristics, a number of foreign policy roles can be imagined that the international unit can play, the most important of which are the base of the revolution, the anti-colonial, the active independent, the opponent of an ideology, the defender of an ideology, the policeman of the region, the international balancer, the international mediator, the peacemaker, the leader developmental, international bridge, loyal ally, model, protectorate, regional defender, leader of regional integration, isolated[2].

The role approach, as theoretical framework within international relations, offers valuable insights when examining the multifaceted impact of drone utilization on regional conflicts in the Middle East. Drones have emerged as pivotal instruments of warfare, transforming the dynamics of conflicts in the region. This abstract discusses how the role approach can illuminate the complex interplay of actors and their identities, interests, and behaviors in the context of drone use.

The Middle East has witnessed a proliferation of drone technologies, altering traditional power dynamics and military strategies. The role approach emphasizes the significance of actors assuming distinct roles within conflicts, be they state actors, non-state entities, or international organizations. By analyzing these roles, one can unravel the motivations driving drone deployment. State actors, seeking to project power, gain strategic advantages, and safeguard national security, often adopt a more conventional role. In contrast, violent non-

[1] Naomi Wish, "Foreign Policy Makers and their National Role Conception, **International Studies Quarterly**, 24, December 1985, pp. 536-539.

[2] Kal. J. Holsti, "National Role Conceptions in Study of Foreign Policy", **Op. Cit**, pp. 260-270.

state actors may assume asymmetric roles, leveraging drones for disruptive tactics and psychological warfare, thus reshaping the conflict landscape.

Furthermore, the role approach enables the assessment of how drone use influences diplomatic efforts, regional alliances, and international perceptions. States deploying drones might portray themselves as responsible actors exercising restraint, even as they pursue strategic objectives. Non-state actors could garner support by framing their drone usage as resistance against oppression. These role-based analyses provide a nuanced understanding of the diplomatic and political ramifications of drone use, which extend beyond immediate military impacts.

Finally, the role approach offers a comprehensive lens through which to examine the impact of drone utilization on regional conflicts in the Middle East. By focusing on the identities, interests, and behaviors of various actors, this framework elucidates the motivations behind drone deployment and the subsequent ripple effects on conflict dynamics, diplomacy, and regional stability. As drone technology continues to evolve and reshape warfare, the role approach remains an indispensable tool for comprehending the intricate nuances of contemporary conflicts in the region.

CHAPTER 3: DRONES EMPLOYMENT IN MIDDLE EAST CONFLICTS

3.1. INTRODUCTION

Armed unmanned aerial vehicles (UAV), known as "drones" or "drones", have been at the forefront of headlines and media over the past few years, given their increasing employment in conflicts, conflict zones and hotspots in the Middle East and North Africa region. In addition to its growing military influence in resolving wars and tipping the battlefield. What made it have a growing vital impact on the political and security dynamics in the context of the fragility of the state in conflict areas and the deepening of competition between regional powers throughout the Middle East[1].

The increasing use of drones in the Middle East has led to these drones becoming the most used weapon in the main fields of conflict in the region, especially in Syria, Yemen, Libya and Iraq. According to many military analysts, drones have begun to replace traditional combat aircraft manned by pilots, until they have become an essential part of battle management. Especially since it is used to direct missiles and artillery fire quickly and effectively and without significant losses. It is a role that conventional combat aircraft may not be able to play. What made this type of "robot" weapon a very wide range in modern battles, especially the asymmetric ones[2].

These planes can be controlled remotely via the automatic flight system, through a command-and-control center run by real pilots, technicians, and experts in the field of digital and military technology. They determine the possible missions and paths and the accurate

[1] Aniseh Bassiri Tabrizi & Justin Bronk, **Armed Drones in the Middle East Proliferation and Norms in the Region**, Royal United Services Institute for Defence and Security Studies (RUSI), December 2018, pp. 2-3.

[2] Majed Akhter, "The Proliferation of Peripheries: Militarized Drones and the Reconfiguration of Global Space", **Progress in Human Geography** (Vol. 2, No. 10, 2017), p. 7.

information to accomplish the required, considering the avoidance of expected dangers and deliberate attempts of jamming to fail the command and guidance system in those aircraft. These drones are classified in terms of shape into three types: fixed-wing aircraft, helicopters, and decoys[1].

There are two main modes of drone control. The first: radio waves if the flight distance is close to the command-and-control unit. The second: satellites in case the flight distance is far from the command-and-control headquarters. The military uses of drones differ according to the technical equipment and equipment they carry. There are reconnaissance uses for drones, such as monitoring, tracking and espionage. There are operational uses such as bombing, firing missiles, throwing explosives, and other war missions.

The use of drones reduces risks and human and material losses, compared to combat aircraft and other reconnaissance aircraft. Drones also make it easier and faster to obtain information compared to military forces on the ground. In addition to its other tactical and strategic advantages compared to what the land and air military forces achieve in the fields of monitoring, tracking, reconnaissance, and intelligence missions[2].

3.2. SAUDI ARABIA: A MAIN ARENA FOR DRONES ACTIVITIES

The Kingdom of Saudi Arabia is the most prominent arena for drone activities in the Gulf region and the Middle East. Since 2015, the Kingdom has been leading a military coalition in support of the internationally recognized government in Yemen against the Houthi group, backed by Iran, who have controlled Sanaa and other large areas of Yemen since 2014. Saudi

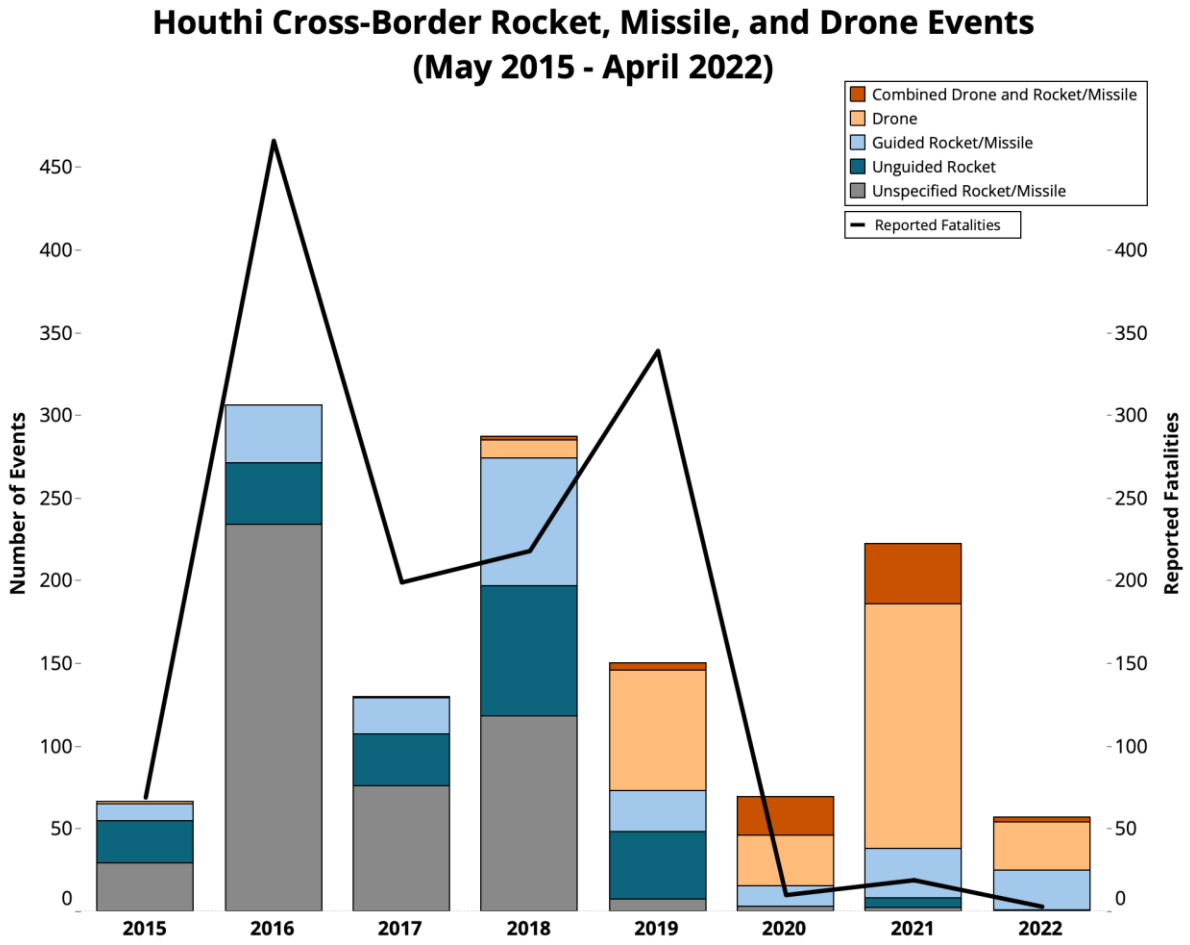
[1] Dave Sloggett, **Drone Warfare: The Development of Unmanned Aerial Conflict**, Pen and Sword Aviation, Barnsley, 2014, pp. 8-10.

[2] Hyunsoo Yang, Yongseok Lee, Sang-Yun Jeon, Dongjun Lee, "Multi-rotor drone tutorial: systems, mechanics, control and state estimation", **Intelligent Service Robotics,** 2017, Vol. 10, Issue 2, pp. 79–93.

Arabia has been constantly attacked by the Houthis using ballistic missiles and drones. Launched from Yemen towards the Kingdom's airports and major military and oil installations.

FIGURE 1

Houthi cross-Border Rocket, Missile, and Events (2015-2022)



- **Source:** Luca Nevola & Ana Marco, Beyond Riyadh: Houthi Cross-Border Aerial Warfare 2015-2022, **The Armed Conflict Location & Event Data Project (ACLED)**, 17 January 2023, accessible at: https://acleddata.com/2023/01/17/beyond-riyadh-houthi-cross-border-aerial-warfare-2015-2022/

The Houthi militia carried out almost 1,000 rocket/missile attacks and over 350 separate drone attacks between 2015 and the first quarter of 2022. The use of unguided rockets has steadily declined, while guided rockets/missiles has climbed from 15% of the yearly total in 2015 to 89% in 2022. This shift indicates significant technological advancements, as well as a decrease in the lethality of such strikes. Between 2015 and 2019, nearly all deadly rocket/missile assaults occurred. Drone assaults, which have surpassed rocket/missile attacks since 2019, have played a critical role in enabling this transformation, allowing for the broadening of military targets and the development of Houthi deterrent credentials[1].

Since the start of the conflict, Houthi missile and drone technology has advanced dramatically. Between 2015 and 2016, Houthi forces relied heavily on a stockpile of rockets inherited from the Yemeni army. However, because of Iranian knowledge, they were later capable of developing long-range missiles and unmanned aerial vehicle capabilities. Since 2018, a domestic military industry has emerged, with headquarters in Sanaa and the northern city of Saada, allowing for a long campaign of rocket, drone, and missile strikes. Technological advancements have also coincided with significant shifts in the Houthis' strategic approach to aerial warfare[2].

In 2019, Houthi aerial warfare looked to push the compellence tactic even further, increasing the lethality53 of assaults to thwart Riyadh's efforts on the Yemeni-Saudi border and re-establish a communication link between Sanaa and Riyadh. Political developments and deliberate military strategies mostly determined this. Yemen's fighting stopped on all major

[1] Luca Nevola & Ana Marco, Beyond Riyadh: Houthi Cross-Border Aerial Warfare 2015-2022, **The Armed Conflict Location & Event Data Project (ACLED)**, 17 January 2023, accessible at: https://acleddata.com/2023/01/17/beyond-riyadh-houthi-cross-border-aerial-warfare-2015-2022/

[2] Michael Knights, Yemen's "Southern Hezbollah": Implications of Houthi Missile and Drone Improvements, **The Washington Institute**, Apr 1, 2021, accessible at: https://www.washingtoninstitute.org/policy-analysis/yemens-southern-hezbollah-implications-houthi-missile-and-drone-improvements

frontlines in 2019. While the Houthis significantly reduced the quantity of cross-border missile attacks on Saudi Arabia, the lethality of missile events climbed significantly, reaching the highest annual level recorded by ACLED throughout the conflict (see graph below). This increase in lethality may not have been caused by the deployment of new high-precision technology, but rather by a broad desire to cause military casualties among Saudi lines.

Concurrently, increased drone capacity enabled the expansion of cross-border operations. In January 2019, Houthi loitering munitions were said to have attacked Saudi positions near the Saudi-Yemeni border, killing numerous people. Drone assaults continued in the months that followed, taking on a new dimension in May when Saudi civilian airports began to be routinely targeted. In reaction to the SLC's "siege of Sanaa airport," Houthi spokesperson Muhammad Abdulsalam described civilian airports as a military target in June[1].

Despite the fact that the missiles were most likely launched from Iranian or Iraqi soil, the Houthis claimed credit for the assaults, giving their partner plausible deniability. On September 20, just a few days after the attack, the Houthis declared a unilateral ceasefire[2].

The attacks were critical in influencing Saudi Arabia's stance toward the Houthis, particularly after the UAE announced a troop reduction in the summer of 2019, weakening the SLC's deployment to Yemen. On April 27, 2019, Saudi Arabia declared a limited ceasefire, which the Houthis officially rejected.59 Despite this, Houthi-Saudi backchannel talks continued, resulting in a significant reduction in cross-border political violence. ACLED statistics show

[1] Twitter @abdusalamsalah, 9 June 2019, accessible at: https://twitter.com/abdusalamsalah/status/1137732703833468928

[2] Yemen's Houthis propose to Saudi Arabia that both sides halt missile strikes, **Reuters**, SEPTEMBER 20, 2019, accessible at: https://www.reuters.com/article/us-yemen-saudi/yemens-houthis-say-will-cease-targeting-saudi-arabia-if-other-side-does-same-al-masirah-idUSKBN1W5261

that Houthi rocket and drone assaults on Saudi Arabia stopped between October and the end of December 2019. Furthermore, cross-border battles between Houthi and Saudi forces decreased substantially and eventually ceased in November[1].

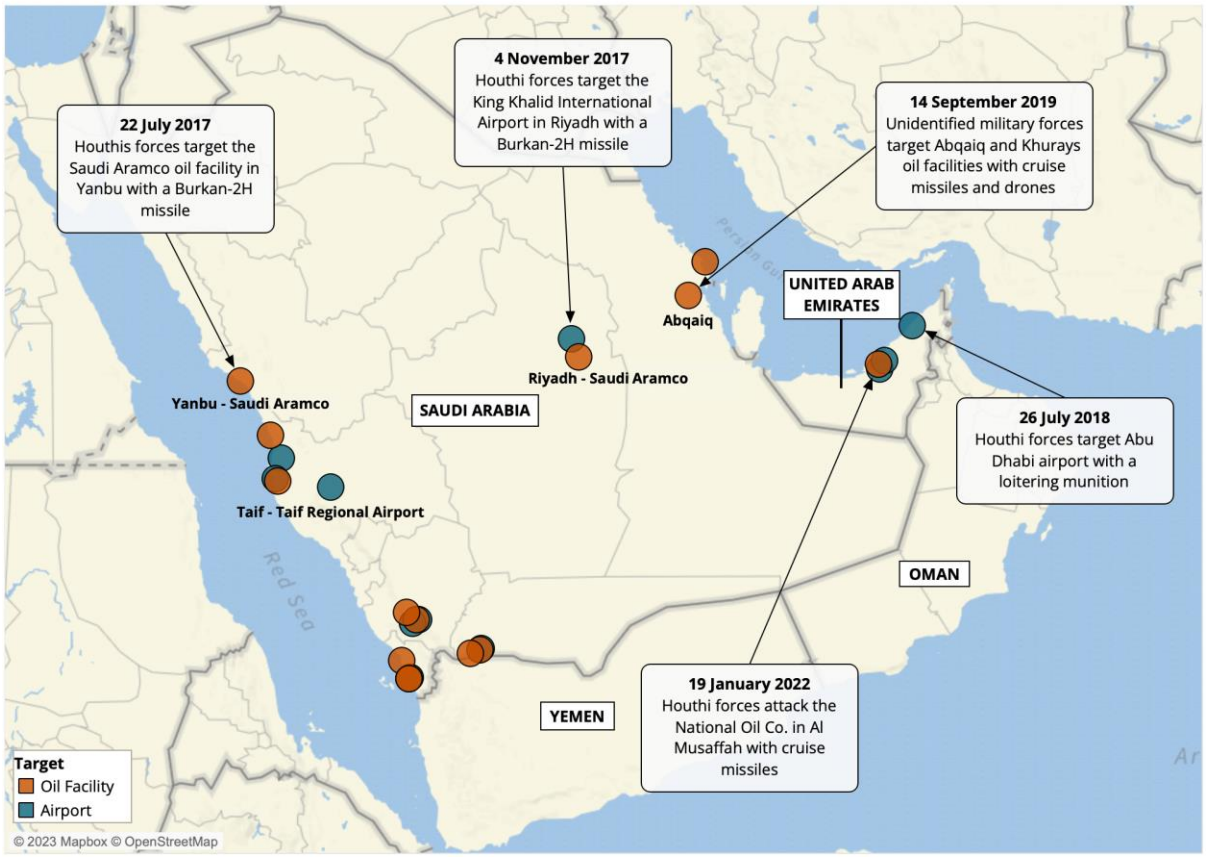
The year 2021 witnessed an intensification of Houthi drone attacks. On March 15, 2021, the military spokesman for the Houthis in Yemen, Yahya Saree, announced that drones had targeted Abha International Airport and King Khalid Air Base in the city of Khamis Mushait, southern Saudi Arabia.

MAP 1

Houthi Rocket, Missile, and Drone Events (2015-2022)

[1] Ibrahim Jalal, After Aramco: Will halting Houthi attacks on Saudi Arabia end Yemen's war?, **Middle East Institute**, October 1, 2019, accessible at: https://www.mei.edu/publications/after-aramco-will-halting-houthi-attacks-saudi-arabia-end-yemens-war

Houthi Rocket, Missile, and Drone Events Targeting Oil Facilities and Airports (October 2015 - April 2022)



- **Source:** Luca Nevola & Ana Marco, Beyond Riyadh: Houthi Cross-Border Aerial Warfare 2015-2022, **The Armed Conflict Location & Event Data Project (ACLED)**, 17 January 2023, accessible at: https://acleddata.com/2023/01/17/beyond-riyadh-houthi-cross-border-aerial-warfare-2015-2022/

On March 8, 2021, Riyadh announced the targeting of the "Ras Tanura" port and a residential area belonging to "Aramco" in the city of Dhahran, in the east of the Kingdom, with two separate attacks. According to the Saudi Ministry of Energy, one of the oil storage yards in the port of "Ras Tanura" was attacked by a drone coming from the sea. In addition to another

deliberate attempt to attack the facilities of Saudi Aramco, near the company's residential neighborhood in the city of Dhahran[1].

On March 4, 2021, the Houthi rebels in Yemen said they had targeted a facility belonging to the Saudi Aramco oil company in the city of Jeddah. In addition to targeting the King Khalid base in Khamis Mushait, amid an escalation in attacks on the Kingdom. While no announcement or confirmation was made by Aramco or the Saudi authorities.

On February 16, 2021, the Joint Forces Command of the Coalition to Support Legitimacy in Yemen, led by Saudi Arabia, announced the interception and destruction of a "booby-trapped" drone launched by the Houthi militia towards the Saudi Abha airport. The coalition announcement comes after the Houthi group announced its attack on the Saudi airports of Abha and Jeddah with two drones. The group described the attack as part of the "legitimate response" to the Saudi escalation against the Houthis. During the month of February 2021, the Houthi group carried out, on a semi-periodic basis, attacks on airports and air bases in southern Saudi Arabia, one of which caused a fire in a civilian aircraft at Abha Airport, according to Saudi sources.

The Abqaiq oil refinery and the Khurais migration field of Aramco, one of the largest oil companies in the world, were previously attacked by the Iranian-backed Houthis in Yemen, on September 14, 2019.

On January 29, 2020, the Houthi group announced massive attacks on sites deep in the Kingdom of Saudi Arabia, affecting facilities of the giant oil company "Aramco", two airports, and a military base in Jizan and Abha. The Houthis had targeted two pumping

[1] Houthi drones target airport, air base in Saudi Arabia, **Anadolu Agency**, march 3, 2021, accessible at: https://www.aa.com.tr/en/middle-east/houthi-drones-target-airport-air-base-in-saudi-arabia/2176138

stations of the "East-West" oil pipeline, which transports Saudi oil from the fields of the eastern region to the port of Yanbu on the Red Sea coast, with explosive-laden drones, on May 14, 2019.

Despite the fortification of Saudi oil facilities with high-level defense systems of advanced American and European models, most notably; The American "Patriot" system, the French "Shaheen" and the Swiss "Sky Guard", however, the Houthi attacks, which are usually carried out with guided missiles or through drones, succeed in reaching their targets in a way that indicates the existence of a large gap in the kingdom's defenses that requires urgent review. by Riyadh[1].

3.3. IRAQ: PRESENCE OF DRONES IN A COMPLEX ENVIRONMENT

On January 3, 2020, the United States of America assassinated the commander of the Quds Force of the Iranian Revolutionary Guard, General Qassem Soleimani. Soleimani is considered the spearhead of the strategy of the militias supported by Tehran in the Middle East, such as the Lebanese Hezbollah and the Houthis in Yemen, the Iraqi Hezbollah, the Popular Mobilization Forces and other Shiite militias in Iraq. The New York Times reported that the Iranian Quds Force commander, Qassem Soleimani, was targeted by firing guided

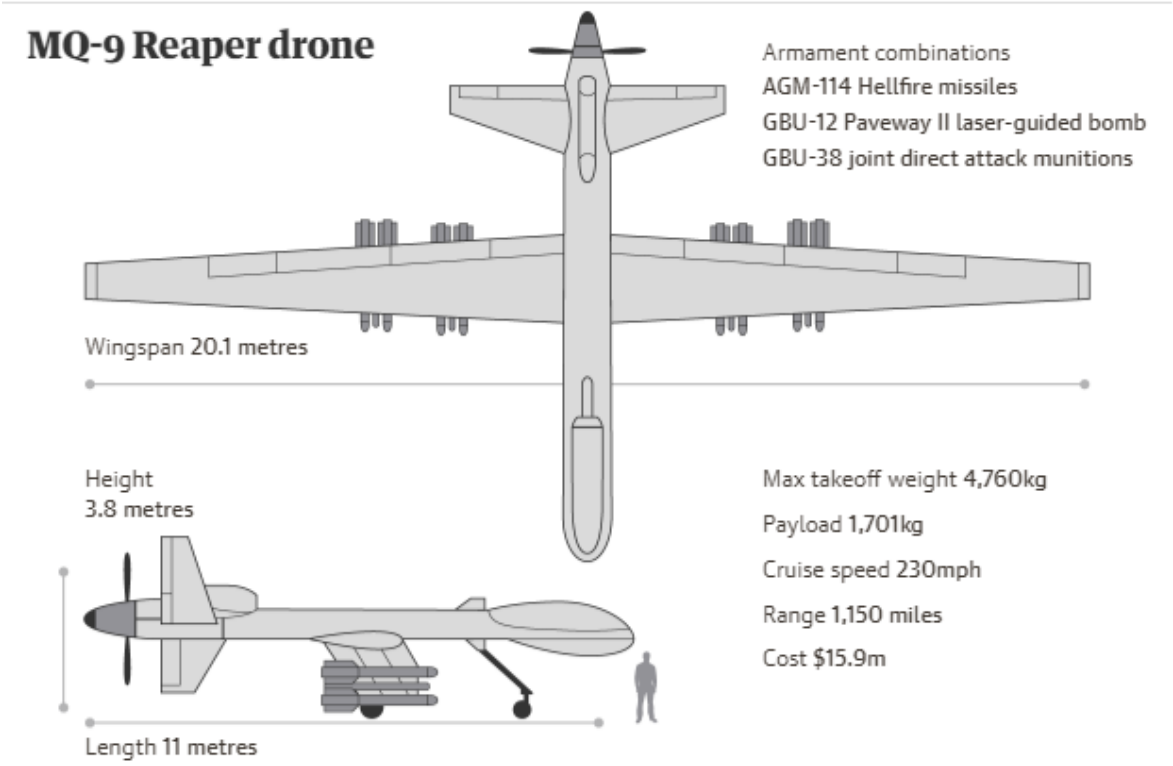
[1] Timeline: Houthis' drone and missile attacks on Saudi targets, **Aljazeera**, 14 Sep 2019, accessible at: https://www.aljazeera.com/news/2019/9/14/timeline-houthis-drone-and-missile-attacks-on-saudi-targets

For more details: Al Houthi Attacks on Saudi Arabia and the UAE, Critical Threats, January 19, 2022, accessible at: https://www.criticalthreats.org/analysis/january-2022-map-update-al-houthi-attacks-on-saudi-arabia-and-the-uae

missiles using a drone. The newspaper stated that the missiles targeted two cars that were carrying Soleimani and other officials[1].

FIGURE 2

MQ-9 Reaper American Drone



Guardian graphic. Source: US Air Force

The Soleimani assassination was carried out using an American MQ-9 Reaper drone. This aircraft performs its tasks at an average altitude of no more than 50,000 feet. The aircraft weighs more than two thousand kilograms. The wing length of this aircraft is more than 20 metres. The speed of the plane that killed Soleimani is close to 400 kilometers per hour. And one plane of this type costs the US treasury 16 million dollars. The lethal capabilities of the

[1] Qasem Soleimani: US kills top Iranian general in Baghdad air strike, **BBC**, 3 January 2020, accessible at: https://www.bbc.com/news/world-middle-east-50979463

aircraft are enhanced by its ability to carry 4 missiles such as the AGM-114 missile and the laser-guided Hellfire missile[1].

Drones have become increasingly popular with coalition forces since the start of the Iraq war in 2003. Drones are unmanned aerial vehicles that are employed for a variety of purposes, including reconnaissance and surveillance, supply delivery, strike operations, and more.

Drones have been used by the US military in Iraq for many years, and their use has expanded dramatically since the combat began. In Iraq, the US Air Force currently uses two types of drones: the MQ-1 Predator and the MQ-9 Reaper. Both of these drones are employed for observation and surveillance, as well as delivering supplies, carrying out strikes, and performing other reconnaissance functions.

Other allied forces, in addition to the US Air Force, have begun to utilize drones in Iraq. Since 2008, the British Royal Air Force has operated a fleet of Reaper drones. They are primarily employed for reconnaissance and surveillance, as well as targeting and striking operations.

Since 2008, the French Air Force has used drones in Iraq. These drones are mostly used for reconnaissance and surveillance. The French Air Force also has a fleet of drones for air-to-ground strikes.

Drones are also being used by the Australian and Canadian militaries in Iraq. The Australian Air Force uses the RQ-7 Shadow, a reconnaissance and surveillance drone, whereas the

[1] "A visual guide to the US airstrike that killed Qassem Suleimani", **The Guardian**, 3 Jan, 2020, accessible at: https://www.theguardian.com/world/2020/jan/03/visual-guide-airstrike-that-killed-qassam-suleimani-us-iran

Canadian Air Force uses the Heron, which is used for both reconnaissance and supply delivery[1].

Iraq has turned into a new arena for drone activities in the Gulf region. On January 23, 2021, the Saudi forces announced the destruction of a hostile air target over Riyadh. And the Saudi forces suggested that it came from Yemen. However, an Iraqi Shiite militia calling itself the "Brigade of True Promise" announced on February 25, 2021, that it was responsible for explosive-laden drones that targeted a Saudi royal palace in the capital, Riyadh, in January 2021. And that those planes had been launched from inside Iraq.

This is supported by what was confirmed by American sources, according to Washington's belief that the January 23, 2021, attack on Al-Yamamah Palace in Riyadh was launched from inside Iraq. American sources confirmed that launching a strike from Iraq represents a challenge to the Saudi air defenses, which focus on the Houthi threats coming from Yemen in the south.

Although the Houthis claimed responsibility for the major attack that targeted Saudi Aramco facilities in September 2019, the statements of the Houthi spokesperson, Yahya Saree, seemed unconvincing. Although some commercial satellite imagery has been used. He claimed that it was obtained through direct Houthi intelligence channels and Houthi drones.

Also, the Houthis usually publish high-quality photos and videos after launching ballistic missiles and drones launched from Yemen, which did not happen in the major Aramco attack. This raised the question of why the Houthis did not quickly release information about the

[1] Marcin Frąckiewicz, The Use of Drones in Iraq: Applications and Regulations, **TS2 Space**, 24 February 2023, accessible at: https://ts2.space/en/the-use-of-drones-in-iraq-applications-and-regulations/

attack, according to Fabian Hinz, research associate at the James Martin Center for Nonproliferation Studies.

During a press conference, on September 18, 2019, in Riyadh, the spokesman for the Saudi Ministry of Defense, Colonel Turki bin Saleh Al-Maliki, said that the Abqaiq and Khurais attacks were launched from the "north", referring to Iraq or Iran, and not from the south, referring to Yemen. In any case, it was carried out under the auspices of Iran.

This vision is consistent with satellite imagery available to the United States of America, which was released on September 15, 2019, in the aftermath of the attack, which shows that the attacks were launched from the north or northwest, indicating Iran or Iraq.

In addition, all the analyzed videos indicate that the starting point of the attacks was from locations north of the affected targets, which means that they were launched from Iran or Iraq. Including a video clip taken from a location near the Saudi-Kuwaiti border, which indicates the presence of a missile over the area. This strongly indicates a possible Iraqi presence in the operations targeting Saudi Arabia with drones and ballistic missiles. It also indicates that Iran is employing its proxies in Yemen and Iraq to distract Saudi air defenses and limit its ability to locate the source of attacks, making it unable to prepare and defend[1].

3.4. SYRIA: TURKISH-ISRAELI DRONES ACTIVITIES

Syria is another major arena of drone activity in the Middle East. Türkiye and Israel stand out in employing drones to achieve strategic security goals in Syria. Despite the divergence of the security goals of both countries in Syria, they agree on the means that is to maximize the use

[1] Shaif Jeremy Binnie, "Attack on Saudi oil facilities deepens regional malaise", **Jane's Intelligence Review**, 09-Oct-2019.

of drones in their military operations inside Syrian territory. Since 2011, Syria has become a backyard for the struggles of competing regional and international powers.

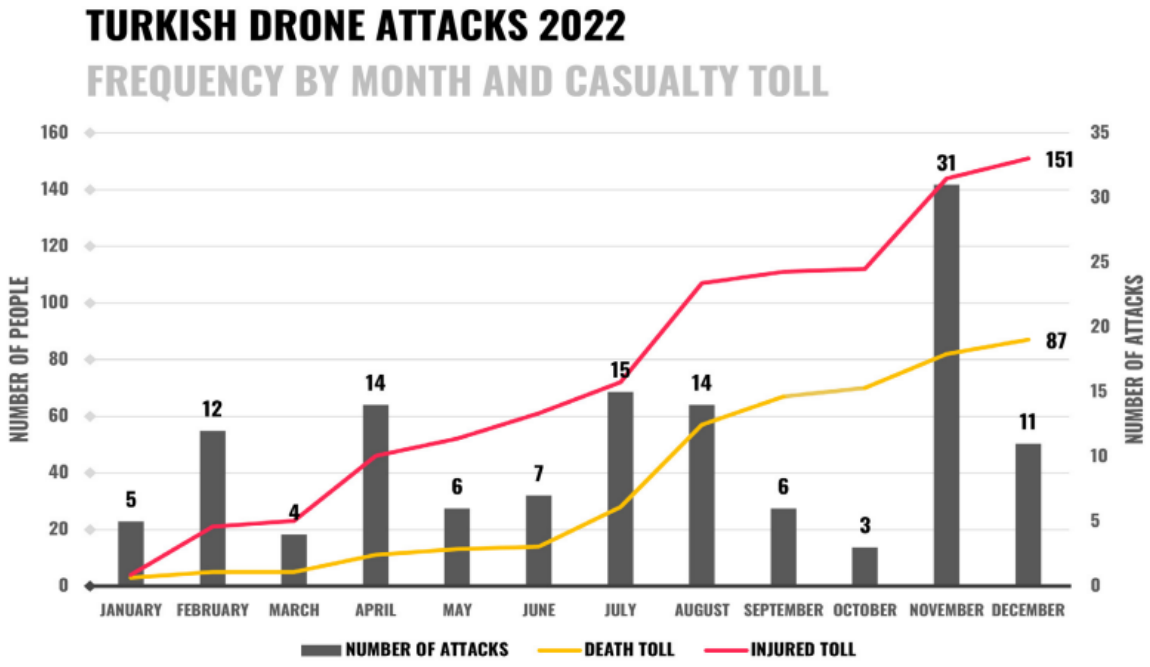
The deployment of Turkish drones in Syria primarily targets military and civilian sites and persons under the Autonomous Administration of North and East Syria (AANES). In 2022, intelligence reports revealed 130 drone strikes in North and East Syria (NES), killing 87 persons and injured 151.

The 130 strikes in 2022 represent a 46% increase over the 89 strikes registered by RIC in 2021. Turkey's drone war in the NES has three major consequences for the region: it impedes the global objective to battle ISIS, it stymies democracy-building efforts, and it creates an unstable and insecure environment for people[1].

FIGURE 3

Turkish Drone Attacks 2022

[1] INCESSANT WAR: TURKEY'S DRONE CAMPAIGN IN NORTH AND EAST SYRIA - 2022, The Rojava Information Center (RIC), MARCH 2023, p.4.



- **SOURCE: INCESSANT WAR: TURKEY'S DRONE CAMPAIGN IN NORTH AND EAST SYRIA - 2022, The Rojava Information Center (RIC), MARCH 2023, p.9.**

In its battle to control Idlib, during the first quarter of 2020, Turkey launched its primary attack using 100 drones. Türkiye has achieved its air superiority in Idlib through a fleet of cheap drones. During that battle, the Syrian regime lost at least two fighter planes, about 8 helicopters, about 135 tanks, and 77 other armored vehicles, along with 2,500 dead, according to the Turkish Ministry of Defense.

In the face of the Turkish drone attacks, the Syrian army is no longer able to protect its forces on the front lines, which have been targeted by cheap, high-precision missiles fired from Turkish drones. Turkey's air capabilities and Ankara's use of drones in its military operations in Syria alerted Russian President Vladimir Putin, an ally of the Syrian regime.

Although Putin was not ready for a direct confrontation with the Turkish army, at the same time he could not allow the Syrian ally to suffer a crushing defeat in Idlib. With Putin and Assad unable to force Turkey out of Idlib, Moscow turned to negotiations with Ankara, which led to a cease-fire in Syria[1].

The main goal of turkey military operation in Syria, also in Iraq, is to keep the PKK away from Turkish territory. Instead of pursuing PKK terrorists within the country, Turkey has shifted from a defensive to an offensive posture, aiming to establish area control across its southern border to prevent PKK forces from massing near its territory. This overarching concept was carried out in various ways in Syria and Iraq. Turkey conducted three military operations in Syria (in 2016, 2018, and 2019) with the explicit goal of preventing the emergence of politically autonomous territories along the Turkish border controlled by the Kurdish-dominated YPG terrorists.

Turkey defines the YPG and its political arm, the Democratic Union Party (PYD), as the PKK's Syrian offshoot, and thus a direct threat to Turkish security. With the addition of a large number of Arab and Assyrian members, the YPG grew into a wider coalition known as the Syrian Democratic Forces (SDF). However, the YPG remains the primary fighting force inside the SDF. Turkey regards this name change as a sham attempt to conceal the PKK relationship and maintains that the YPG, PYD, and SDF are all branches of the PKK.

Turkey attempts to explain these cross-border operations as self-defense based on this notion. The SDF, on the other hand, claims to be a Syrian umbrella organization wholly separate

[1] Mitch Prothero, Turkey used a new weapon in Syria that was so effective it looks like Russia won't dare confront Turkey directly, **Insider**, Mar 10, 2020, accessible at: https://www.insider.com/turkey-drones-syria-russia-wont-confront-directly-2020-3

from the PKK. The truth lies somewhere in the middle. In terms of philosophy, the YPG, PYD, and SDF are clearly tied to the PKK, and they also have organizational ties.

A fourth operation in the Idlib region in 2020 did not directly target PKK affiliates, but it was consistent with Turkey's objective to preserve territorial control and construct a buffer zone along the Turkish-Syrian border[1].

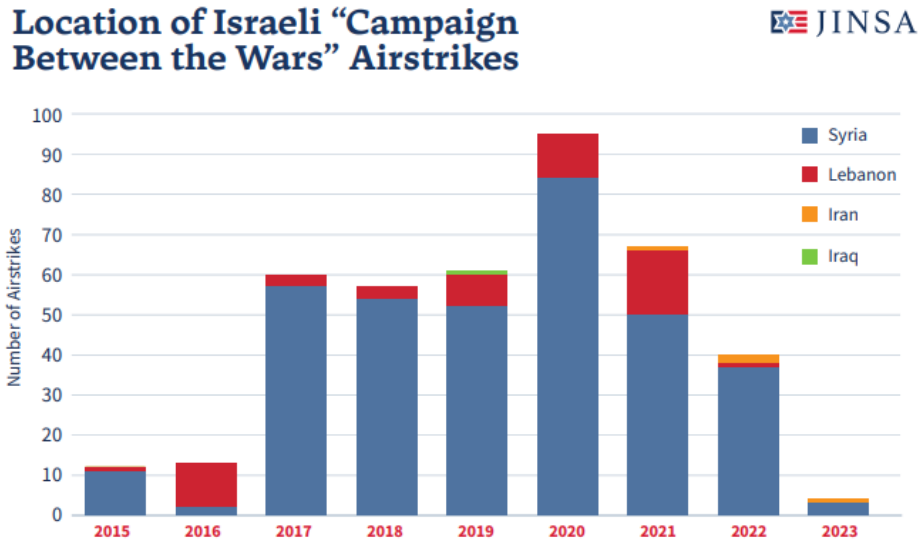
Since the Syrian civil war began in 2011, Israel has launched hundreds of airstrikes against its northern neighbor, targeting both government troops and allied Iran-backed forces and Hezbollah fighters. While Israel rarely discusses specific events, it has admitted to carrying out hundreds of strikes. It claims that the air campaign is required to prevent arch-foe Iran from building a foothold on its doorstep[2].

FIGURE 4

Location of Israeli Airstrikes (2015-2023)

[1] Salim Çevik, Turkey's Military Operations in Syria and Iraq, **The Centre for Applied Turkey Studies (CATS), Stiftung Mercator and the German Federal Foreign Office**, May 2022, pp.1-2.

[2] Jonathan Regev, Alleged Israeli strikes in Syria destroy Hezbollah warehouse - report, **i24news**, November 13, 2022, accessible at: https://www.i24news.tv/en/news/middle-east/levant-turkey/1668355867-israeli-airstrikes-targeting-homs-syrian-media



- **Source: Andrew Ghalili & Ari Cicurel, Israel Degrades Iranian Capabilities, Protects International Security, NatSec Brief, The Jewish Institute for National Security of America (JINSA), February 1, 2023, p.2.**

Syria is the main arena for Israeli drone attacks in the Middle East. Since launching its "Campaign Between the Wars" in 2015, Israel has carried out over 400 attacks to damage Iran's weapon proliferation and development, including 350 in Syria, over 50 in Lebanon, four in Iran, and one in Iraq[1].

3.5. LIBYA: A DECISIVE ROLE OF TURKISH DRONES

Turkey is considered the largest external supporter of the Libyan Government of National Accord (GNA) forces in their confrontation with the "Libyan National Army" (LNA) led by Khalifa Haftar. In the battles of 2020, the Al-Wefaq government achieved a series of major victories, with Turkish support. Turkish drones were at the forefront of those battles. After reaching defense agreements between the Government of National Accord in Libya, headed

[1] Andrew Ghalili & Ari Cicurel, Israel Degrades Iranian Capabilities, Protects International Security, NatSec Brief, **The Jewish Institute for National Security of America (JINSA)**, February 1, 2023, p.2.

by Fayez al-Sarraj, and Turkey, on November 29, 2019, the Libyan government was quick to change the equation in the air campaign against the Libyan National Army forces. The two partners took advantage of the Berlin conference held in January 2020 to form an air protection layer around the Libyan capital, Tripoli.

PHOTO 1

"Mitiga" Air Base in Libya

The Government of National Accord (GNA) has succeeded in providing air protection for Tripoli by deploying several surface-to-air missile systems around the "Mitiga" Air Base. The combination of American-made medium-range MIM-23 Hawk missile systems, short-range Hisar surface-to-air missiles and Korkut anti-aircraft guns has created a multi-layered protection system around critical infrastructure. This also reduced the threats related to the ground stations of the "Government of National Accord" drones and their launches, and this

protection, along with an increase in the number of Turkish operators and Turkish equipment, allowed the forces of the internationally recognized Libyan government to increase the number of their operations with drones. This also contributed to increasing the effectiveness of these operations.

The Government of National Accord (GNA) primarily employs the Turkish Bayraktar TB2, which is smaller and has a shorter range than its LNA counterparts but still delivers significant intelligence and precision attack capabilities. Its primary goals are to increase GNA battlespace awareness through reconnaissance and interdiction against Libyan National Army (LNA) supply lines and conduct targeted strikes. In Syria, Turkey utilized the Bayraktar with comparable success, where it excelled in a more classic combined-arms setting of supporting artillery and fixed-wing strikes.

Ankara has also shielded “Mitiga” Air Base with the Koral, a jamming system with promised capabilities against Pantsir missile radars and Wing Loong drone datalink frequencies. These dual jamming capabilities could explain the GNA drone force's greater survivability and recent interruptions[1].

British Defense Secretary Ben Wallace has praised the performance of Turkish combat drones and electronic warfare (EW) systems in Libya and Syria respectively. He said during the "Air and Space Force 2020" conference organized by the Royal Air Force via the Internet, on July 15, 2020, (We need to look at the lessons of others, see how Turkey operates in Libya, where it has used "Bayraktar TB2" planes since mid-2020. 2019. Those drones conducted intelligence, surveillance, reconnaissance, and targeting operations against front

[1] Ben Fishman, Conor Hiney, What Turned the Battle for Tripoli?, **The Washington Institute for near east policy**, May 6, 2020, accessible at: https://www.washingtoninstitute.org/policy-analysis/what-turned-battle-tripoli

lines, supply lines, and logistical bases), and Wallace added that in July 2019, Turkey bombed the Al-Jafra air base controlled by the Libyan National Army led by Khalifa Haftar. This led to the destruction of many command and control points and transport aircraft[1].

The UN's Special Representative for Libya said in a 2019 interview that drones were employed aggressively in the Libyan conflict to carry out air strikes, "600 times on one side, 200-300 times on the other side", and called the fight as "possibly the largest drone war theatre now in the world"[2]. The United Nations Panel of Experts on Libya, established in accordance with UN Security Council Resolution 1973 (2011), also referred to a "drone war" in Libya, detailing intense lethal exchanges carried out by various types of drones and naming many foreign countries that provided military technology to battling parties[3].

Having an advantage in the air may have resulted in advances on the ground. This was most evident when Turkey's military participation on the side of the GNA and procurement of modern weapons, particularly combat drones with precise air strike capabilities, reversed the tide in the conflict[4].

[1] Defence Secretary Ben Wallace gives a speech at the Air and Space Power Conference, **GOV.UK**, 15 July 2020, accessible at: https://www.gov.uk/government/speeches/defence-secretary-ben-wallace-gives-a-speech-at-the-air-and-space-power-conference

[2] United Nations, "Special Representative Expresses Outrage over Actors Talking Peace while Fuelling Conflict in Libya, as Security Council Hears Calls for End to Foreign Meddling", 30 January 2020, accessible at: https://www.un.org/press/en/2020/sc14092.doc.htm

[3] United Nations Security Council, Letter dated 29 November 2019 from the Panel of Experts on Libya established pursuant to resolution 1973 (2011) addressed to the President of the Security Council (S/2019/914), 2019, accessible at: https://digitallibrary.un.org/record/3838591

[4] Jason Pack and Wolfgang Pusztai, Turning the Tide: How Turkey Won the War for Tripoli. **The Middle East Institute Policy Paper** (Washington DC: The Middle East Institute, 2020); Ioannis Sotirios Ioannou and Tziarras Zenonas. Turning the Tide in Libya: Rival Administrations in a New Round of Conflict. PRIO Cyprus Centre Policy Brief, 1 (Nicosia: **PRIO Cyprus Centre**, 2020).

CHAPTER 4: THE DRONES MARKET IN THE MIDDLE EAST

4.1. OVERVIEW

Except for Israel, the Bayraktar TB2 and Chinese Drones such as the Wing Loong and Cai Hong 4B seem to be the most popular in the Middle East and North Africa. It demonstrates the leading role of Turkey and China in the regional market for drones in the Middle East and North Africa. Chinese and Turkish superiority comes at the expense of the United States of America. USA is the largest country that manufactures and possesses advanced drone technology in the world. This superiority is due to Ankara and Beijing following completely liberal export policies regarding the export of drones without considering human rights considerations and the democracy of the ruling regimes in the region[1].

The United States holds arms companies to strict restrictions imposed by US National Arms Export Regulations such as the Conventional Arms Transfer (CAT) policy and non-binding standards established by the International Missile Technology Control Regime (MTCR). Washington adheres to these standards voluntarily with the aim of limiting the spread of missile technology. Especially missiles and unmanned aerial vehicles capable of delivering a payload of no less than 500 kg to a range of no less than 300 km. As well as all the equipment, software and technology for these advanced systems[2].

[1] Adam Rawnsley, "Meet China's Killer Drones", **Foreign Policy**, January 14, 2016, accessible at: https://foreignpolicy.com/2016/01/14/meet-chinas-killer-drones/

[2] "UAV Export Controls and Regulatory Challenges, Working Group Report", **The Stimson Center**, 2015, accessible at: https://www.stimson.org/wp-content/files/file-attachments/ECRC%20Working%20Group%20Report.pdf

The integration between the Missile Technology Control Regime (MTCR) and US domestic laws, especially the International Traffic in Arms Regulations (ITAR), and other international regulations such as the Arms Trade Treaty, which Washington follows, has significantly restricted US drone exports despite it being the largest operator of drones. In addition to the commitment of the strict American arms export policy to the security of Israel and the reluctance to sell advanced technology to Arab countries that might use it against Israel in a potential conflict, in what is known as the strategy of ensuring Israel's armed superiority over its Arab neighbors.

From a commercial perspective, China is the first driver of the regional drone market in the Middle East and North Africa. Given that it is not bound by any legal considerations related to the Missile Technology Control Regime (MTCR) or other legal frameworks restricting arms flows in international trade. China is also not concerned with human rights issues and democratization in general, unlike the United States of America. The proliferation of Chinese drones has disrupted the arms market in the Middle East. Chinese drones have become accessible to a wider group of customers, both state and non-state actors. Considering that the Middle East region is filled with many militias and armed organizations. and this region includes a wide range of local agents of regional powers that wage proxy wars to achieve their strategic goals and interests.

US restrictions on the sale of drones, especially armed models, have proven to be a double-edged sword. These restrictions protect American technology and prevent its drones from being involved in misuse or employment in wars and conflicts that result in horrific humanitarian losses. But at the same time, American restrictions have reduced the American economic and commercial share in the huge drone market in the Middle East and North

Africa region. These restrictions have harmed bilateral security partnerships between the United States and its regional allies in the Middle East. It also limited the security capabilities of US allies and forced them to resort to Chinese drones[1].

4.2. THE MIDDLE EAST AS A MAJOR MARKET FOR DRONS

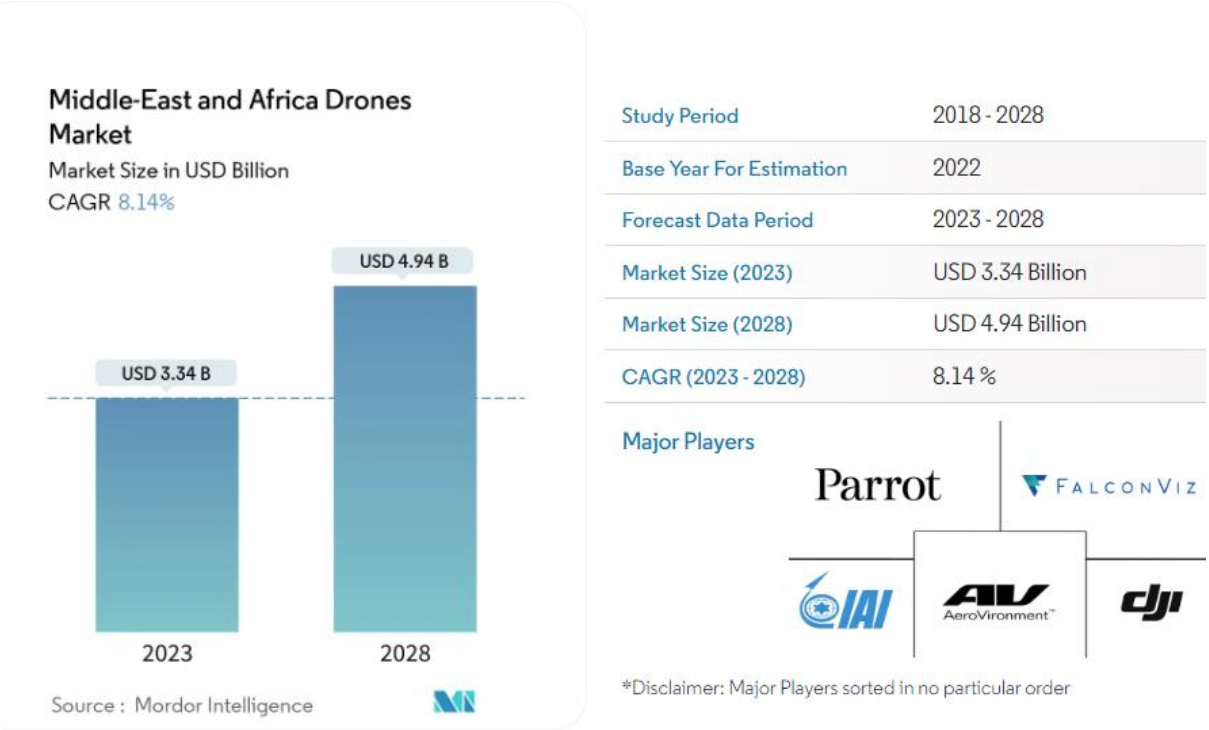
The Middle East and Africa Drones Market is predicted to be worth USD 3.34 billion in 2023 and USD 4.94 billion by 2028, increasing at an 8.14% CAGR during the forecast period (2023-2028)[2].

FIGURE 5

Middle East and Africa Drones Market

[1] George Nacouzi, J.D. Williams, Brian Dolan, Anne Stickells, David Luckey, Colin Ludwig, Jia Xu, Yuliya Shokh, Daniel M. Gerstein, Michael H. Decker, **Assessment of the Proliferation of Certain Remotely Piloted Aircraft Systems: Response to Section 1276 of the National Defense Authorization Act for Fiscal Year 2017**, RAND Corporation, 2018, pp. 21-26.

[2] MIDDLE EAST AND AFRICA DRONE SERVICES MARKET SIZE & SHARE ANALYSIS - GROWTH TRENDS & FORECASTS (2023 - 2028), **Mordor Intelligence**, accessible at: https://www.mordorintelligence.com/industry-reports/middle-east-and-africa-drones-market



- **Source: MIDDLE EAST AND AFRICA DRONE SERVICES MARKET SIZE & SHARE ANALYSIS - GROWTH TRENDS & FORECASTS (2023 - 2028), Mordor Intelligence, accessible at: https://www.mordorintelligence.com/industry-reports/middle-east-and-africa-drones-market**

The Middle East Military Drones Market is expected to expand at a rapid pace during the forecast period, 2022-2027. The rapidly increasing demand for technologically advanced defense systems by various countries across the Middle East, i.e., soaring demand for military drones in applications such as surveillance, transportation, monitoring, mapping, and combat operations, is driving market growth. Furthermore, rapidly rising defense budgets and government incentives for the manufacturing and deployment of military drones are propelling the market[1].

[1] Middle East Military Drones Market Research Report: Forecast (2022-27), **MarkNtel Advisors**, Mar 2022, accessible at: https://www.marknteladvisors.com/research-library/middle-east-military-drones-market.html

Furthermore, the incorporation of Artificial Intelligence (AI) and the Internet of Things (IoT) into military drones with features such as picking targets autonomously with precision and persistence will boost their procurement across the Middle Eastern defense sector in the coming years. Several R&D operations by the market's top players to bring advancements in these drones, as well as other technologies such as Infrared Thermography (IRT) and Hyperspectral Imaging (HSI), are expected to boost the market through 2027[1].

A report published by Reuters, on July 17, 2019, revealed that the global drone market will nearly triple its current size over the next ten years, reaching about 14.3 billion US dollars, while drone sales in 2018 reached a value of 4.9 billion. US dollars, according to estimates by Teal Group, which specializes in analyzing aerospace data[2].

The Reuters report raises many security concerns and problems about the nature of the use of drones in the Middle East. At both the military and non-military levels. Considering the international and regional competition for the production and possession of drones, and their effects on national and regional security. These risks are increased by the openness of the drone market to states, regular armies, and professional intelligence services, in addition to non-state armed actors. This type of non-state actors has become more involved in the current regional conflicts in the Middle East.

The United Arab Emirates, and Saudi Arabia are among the Middle East's well-established economies. Many Middle Eastern countries' military sectors are expanding; thus, they are making increasing efforts to strengthen their armed forces. According to data from the Global

[1] **Ibid**.

[2] "Global drone market estimated to reach $14 billion over next decade: study", **Reuters**, JULY 17, 2019, accessible at: https://www.reuters.com/article/us-usa-security-drones-idUSKCN1UC2MU

Firepower website, Egypt, Turkey, Israel, Saudi Arabia, and Iran are among the main countries in the region with strong armed forces. Furthermore, governments are investing much in bolstering their various military forces.

According to the International Institute for Strategic Studies (IISS), Saudi Arabia has the region's highest military investments. Riyadh's defense expenditure exceeded the combined budgets of the Middle East's next five largest spenders (Israel, Iraq, Algeria, Iran, and Oman). Significant military investments allow these countries to acquire cutting-edge technologies such as drone simulators. According to SIPRI data, South Africa, Saudi Arabia, and the UAE invested US$ 3,151 million, US$ 57,519 million, and US$ 17,725 in efforts to enhance their armed forces in 2020, respectively.

Supply chain difficulties during the COVID-19 epidemic have had a significant impact on the Middle East drone simulator market. This is primarily due to countries' limited borders. Furthermore, demand for drones in Middle East countries is expected to fall in 2020. As a result, drone simulator firms marketing their products to end users in the Middle East have lost business. Furthermore, demand for advanced drone components, such as various types of portable drone simulator for military drone fleet and commercial aviation fleet, declined dramatically in 2020 among drone makers, military forces, and MRO service providers[1].

The Middle East drone simulator market is predicted to increase from US$ 43.69 million in 2021 to US$ 80.62 million by 2028, at a CAGR of 9.1% from 2021 to 2028. Drones have been used by armed forces from various countries for more than a decade. Small drones are frequently used by ground soldiers. Military investment on unmanned aerial vehicles (UAVs)

[1] Middle East & Africa Drone Simulator Market Forecast to 2028, **Business Market Insights**, Oct 2021, accessible at: https://www.businessmarketinsights.com/reports/middle-east-and-africa-drone-simulator-market

is increasing as a percentage of total military spending, fueling the expansion of specialised drone manufacturers and simulator software developers. Several drones are being developed expressly for surveillance. Some drones, on the other hand, have been created for critical duties such as weapon transportation.

Countries such as the United Arab Emirates (UAE) use remotely controlled unmanned aerial vehicles (UAVs) to transport armaments for defense forces. In addition, drones are used as loitering weapons. Drones are also used in real-time to collect intelligence, surveillance, and reconnaissance (ISR) data on ongoing and life-threatening military missions. As a result of the factors outlined above, the need for drone simulators is expanding.

The market for Middle East drone simulators is divided into component, simulator type, drone type, technology, and nation. The Middle East drone simulator industry is divided into two components: hardware and software. In 2020, the hardware segment held the biggest market share. The Middle East drone simulator market is divided into fixed and portable simulators. In 2020, the fixed category held the highest market share.

The Middle East drone simulator market is divided into fixed wing and rotary wing drones. In 2020, the fixed wing segment had the biggest market share. Similarly, the MEA drone simulator market is divided into augmented reality and virtual reality depending on technology. In 2020, the virtual reality segment held the biggest market share. The Middle East drone simulator market is divided into Saudi Arabia, the UAE, and the rest of Middle East. In 2020, the UAE had the greatest market share[1].

[1] **Ibid**.

According to estimates by research institutions specialized in analyzing aerospace data, China currently accounts for about 75% of the drone market around the world, as Beijing enjoys a lot of flexibility that has made it express its willingness to sell drones produced by its giant companies for scientific and military purposes to all countries[1]. The Royal United Services Institute in London (RUSI), a security and military think tank, has described China's approach to its drone sales as "selling without accountability"[2].

There are many drones produced by China. Most notable is the Chinese Cai-Hong drone, known as Rainbow. Cai-Hong occupies a high position on the list of the largest Chinese exports around the world, especially in the Middle East. Cai-Hong is produced by the China Aerospace Science and Technology Corporation, the largest contractor for China's space programme. The CH4 and CH5 are the most popular models of the Cai-Hong. China is also in the process of producing the CH7 model in 2022.

According to a report published by Bloomberg in October 2018, China's sales of the CH4 drone model amounted to about 700 million US dollars during the period 2014-2018. Many Middle Eastern countries are on the list of the most prominent customers of this Chinese model of drones. While 10 other countries are still waiting to conclude deals with Beijing to purchase many of its drones during the coming period[3].

[1] "DoD warns China exporting killer autonomous drones to Middle East", **Flight Global**, 6 November 2019, accessible at: https://www.flightglobal.com/defence/dod-warns-china-exporting-killer-autonomous-drones-to-middle-east/135194.article

[2] Report: China is driving use of armed drones in Middle East", **AP news**, December 17, 2018, accessible at: https://apnews.com/article/56cfdc2ab6224891a264fc88f70200c8

[3] "Chinese Armed Drones Now Flying Across Mideast Battlefields", **Bloomberg**, October 3, 2018, accessible at: https://www.bloomberg.com/news/articles/2018-10-03/chinese-armed-drones-now-flying-across-mideast-battlefields

4.3. DRONE MANUFACTURING IN ISRAEL, TURKEY AND IRAN

The Middle East region has acquired more military hardware in the last ten years than any other region (apart from Asia and Oceania), according to the Stockholm International Peace Research Institute (SIPRI). However, the Middle East and North Africa are not just avid arms importers. Additionally, they are working harder than ever to develop domestic defense capabilities and start exporting. Their objectives are to expand into the lucrative defense industry, relieve pressure on their own finances by being able to purchase domestically, and provide military equipment support to friends throughout the area.

The Israeli Ministry of Defense reports that in 2022, Israel's defense exports hit a new high of $12.5 billion, driven mostly by strong international demand for drones and air defense systems. A MoD report made public today also indicated continuous expansion in a brand-new, sizable market for Israeli technology: Gulf nations that are signatories to the Abraham Accords and purchased defense platforms worth about $3 billion. Accordingly, sales to nations with which Israel has established new relationships have risen to a level that is virtually equal to the $3.6 billion in sales that Israel made in 2005 since the peace agreements were signed in 2020.

Overall, "Israeli defense exports have doubled in less than a decade and increased by fifty percent in three years," the Ministry reported. Israel has long been a leader in drone exports since it invented the UAV in the 1980s and was a key player in the development of loitering weapons.

PHOTO 2

IAI Heron Drone

A quarter of the contracts inked in 2022, according to the Israeli research, were for UAVs and drones, despite competition from China, Turkey, and other drone makers. Elbit Systems, Rafael Advanced Defense Systems, and Israel Aerospace Industries are the three major defense firms in Israel, and they all have a stake in the UAV and counter-UAV markets. IAI sells the Heron brand of drones, whereas Elbit manufactures the massive Hermes 900 drone. Rafael has a stake in Aeronautics, the company that produces the Orbiter line.

Israel is home to about 120 defense firms, many of which are smaller firms that specialize in novel technology like radars, rifle sights, or C-UAS systems. Government-to-government agreements, like the one signed in May between the defense ministries of Israel and the

Netherlands for PULS Rocket Artillery Systems valued at $305 million, are sometimes the driving force behind Israel's defense sales[1].

Israel is a drone innovation hotspot, with 50 drone enterprises and startups. In 1962, the country began work on building drones, also known as unmanned aerial vehicles (UAVs), for defense purposes. Israel is the world's leading supplier of drones, and the country's drone-tech ecosystem has prepared Israeli enterprises to meet the predicted surge in demand for drone technology across a wide range of applications[2].

The Ministry of Defense's International Defense Cooperation Directorate, known as SIBAT, releases an annual directory that highlights Israel's many defense advances. It spends 30 pages to UAVs, which it classifies as a separate section rather than as part of aerospace, demonstrating Israel's interest in this area of defense technology[3].

In 2018, the Ministry of Economy and Industry published a pamphlet on investing in unmanned aerial vehicles and drones. It claims that 50 Israeli startups are producing 165 UAVs. The industry had already exported $1.5 billion by 2005 and was the world's largest exporter by 2013. From 2005 to 2012, revenues increased by $4.6 billion. Drones are a major deal.

[1] SETH J. FRANTZMAN, Israel records $12.5 billion in defense exports, led by drones, air defense, Breaking Defence, June 14, 2023, accessible at: https://breakingdefense.com/2023/06/israel-records-12-5-billion-in-defense-exports-led-by-drones-air-defense/

[2] Israel's Drone Industry Reaches New Heights, Tackles Public Challenges, **Ministry of Economy and Industry, Israel**, March 2020, accessible at: https://itrade.gov.il/singapore/2020/03/16/israels-drone-industry-reaches-new-heights-tackles-public-challenges/

[3] SETH J. FRANTZMAN, How Israel became a leader in drone technology, **The Jerusalem Post**, JULY 13, 2019, accessible at: https://www.jpost.com/israel-news/how-israel-became-a-leader-in-drone-technology-595209

Half of the drones are bound for Europe, while the other third are bound for Asia. UAVs account for about 10% of Israel's defense exports. Israel is also at the forefront of anti-drone technology. By the end of 2017, Israel's defense exports totaled $9.2 billion, with UAVs accounting for a percentage of that amount. According to an article on Emerj, Israel's leadership role in exporting drones is due to the country's long experience, as well as the fact that "70% of the Air Force flying time" was done in UAVs, with over 100 varieties being flown[1].

In Turkey, to battle the Kurdistan Workers Party (PKK), Ankara frequently deployed drones from the United States. It also deployed Israeli Heron UAVs for intelligence gathering. However, problems with its engine and imaging equipment meant that deployment was delayed significantly. Furthermore, for its invasion of Cyprus in 1975, Turkey faced an arms embargo from the United States, which severely hampered its defense capabilities during the military campaign. The embargo allowed Turkey to see the significance of creating its own defense sector. As a result, Turkey's efforts to create indigenous UCAV technology are an extension of this recognition[2].

PHOTO 3

The Bayraktar TB2 Turky Drone

[1] **Ibid**.

[2] Umar Farooq, The Second Drone Age: How Turkey Defied the US and Became a Killer Drone Power, The Intercept, May 14, 2019, accessible at: https://theintercept.com/2019/05/14/turkey-second-drone-age/

The Bayraktar TB2, built by Selçuk Bayraktar at the Turkish technology company Baykar, is fundamental to Turkey's successful drone indigenisation story. Its first effective strike against the PKK was in the Hakkari province in 2016. It was later employed against the Islamic State during the Syrian Civil War during Operation Euphrates Shield and Operation Olive Branch. The TB2s were also deployed to Libya in 2019 to assist the Government of National Accord (GNA) in maintaining its capital in Tripoli. They aided the UN-backed government in retaking nearly all of Western Libya.

The TB2s were also crucial in Azerbaijan's decisive victory over Armenia during the Nagorno-Karabakh conflict in 2020. TB2s are also used by Nigeria, Ethiopia, Qatar, Morocco, and Poland, in addition to Ukraine and Azerbaijan. Turkish officials have mastered

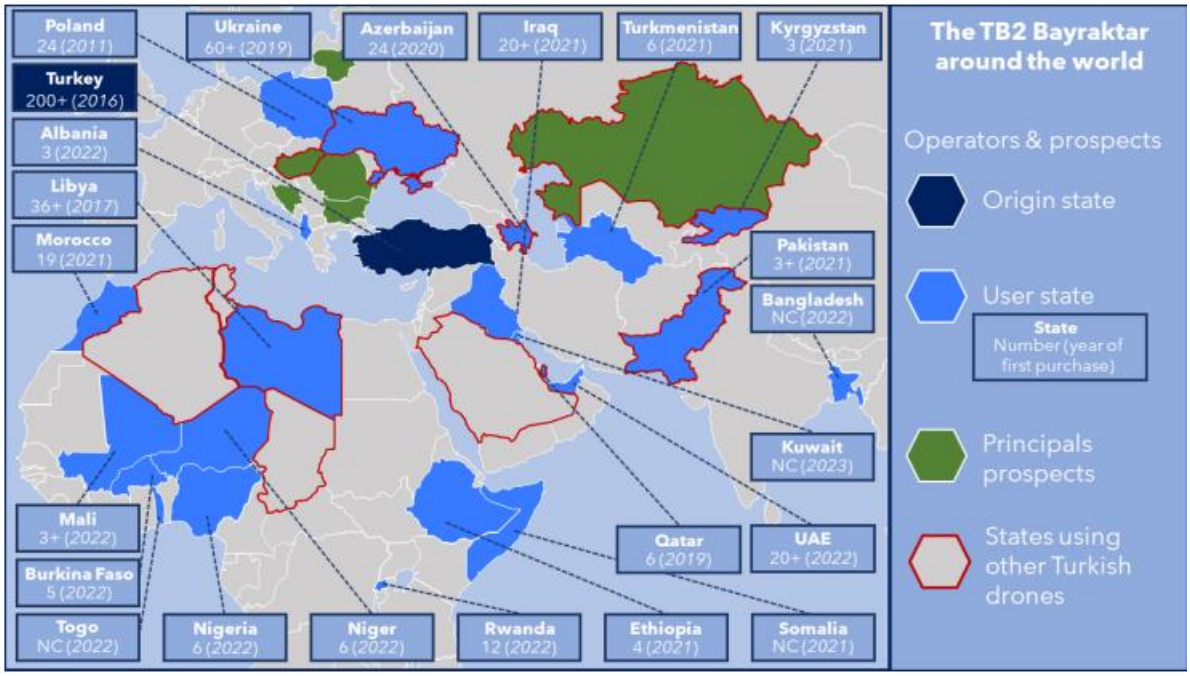
the use of TB2s as geopolitical leverage[1]. In exchange for access to minerals and liquefied natural gas, it inked a defense arrangement with Nigeria that included training the country's pilots to operate TB2s. In Ethiopia, TB2s were distributed after the government seized several Gülenist schools suspected of anti-Erdogan activity. Obtaining weaponry from Turkey, unlike negotiating with the US, does not entail human rights scrutiny. In addition, Turkey outbid China, Europe, and the United States to provide eighteen TB2 drones to Kuwait in a $370 million deal[2].

FIGURE 6

Exports and prospects of the TB2 Bayraktar

[1] Turkey expands armed drone sales to Ethiopia and Morocco – sources, Turkey expands armed drone sales to Ethiopia and Morocco - sources, **Reuters**, October 14, 2021, accessible at: https://www.reuters.com/world/middle-east/turkey-expands-armed-drone-sales-ethiopia-morocco-sources-2021-10-14/

[2] Delma Joseph and Preetish Kamat, The Implications Of Drone Proliferation In The Geopolitics Of The Middle East, **The Defence Horizon Journal**, March 20, 2023, accessible at: https://www.thedefencehorizon.org/post/uav-ucav-dones-proliferation-middle-east



- **Source: Léo PÉRIA-PEIGNÉ, TB2 Bayraktar Big Strategy for a Little Drone, Security Studies Cente, April 17, 2023, accessible at:** https://www.ifri.org/sites/default/files/atoms/files/peria-peigne_tb2_bayraktar_2023.pdf

This achievement brings the total number of customer states for the TB2 drone to 28. It is worth noting that Kyrgyzstan is the second country after Turkey to own all four types of UCAV versions made by Turkey. As a result, UCAVs have become a vital foreign policy tool for Turkey in projecting its influence beyond its borders. It has allowed the state to intervene in places where it would not have otherwise, resulting in increasing military activism at no cost to its civilian population. Conflicts in Ukraine and Nagorno-Karabakh are two instances[1].

[1] **Ibid**.

Without a doubt, Turkey has pursued an assertive foreign policy by expanding its military presence outside its borders. Turkish-made, complex defense products of the fifth generation have altered the status quo in the South Caucasus, Libya, and Ukraine. Sales of weapons and technologies, particularly drones, have aided Turkey's foreign relations, particularly with Azerbaijan, Libya, Morocco, Malaysia, Romania, Poland, Kazakhstan, Kyrgyzstan, Uzbekistan, and Turkmenistan. Nonetheless, there is enormous global demand for combat-proven Turkish defense industrial products, paving the way for a new level of bilateral cooperation[1].

The Turkish Exporters Assembly (TIM) has released the top exporters in 27 categories, demonstrating that the defense and aerospace industry's export colossus has shifted after several years. Baykar, the creator of the world-renowned Bayraktar TB2 unmanned combat aerial vehicle (UCAV) and the newer Aknc state-of-the-art UCAV, outstripped Turkish Aerospace Industries (TAI), which manufactures aircraft structures for worldwide aviation firms. With the contracts it signs, Baykar is constantly increasing its export income. Last year, the corporation made $664 million in UCAV exports. This amounted to more than 80% of the company's 2021 revenue[2].

In Iran Following the 1979 Islamic Revolution, Tehran was forced to build its own technology because it no longer had access to outside power, asymmetric technologies, and other advanced, expensive platforms that its rivals did. As a result, it began to invest in ballistic missiles in order to increase their range and precision. As a result, it began to make

[1] Yusuf Alabarda, Türkiye's defense industry has come a long way, **Anadolu Agency**, May 10, 2023, accessible at: https://www.aa.com.tr/en/analysis/opinion-turkiyes-defense-industry-has-come-a-long-way/2893594

[2] Baykar becomes top exporter in Turkey's defense, aerospace sector, **DAILY SABAH**, JUN 15, 2022, accessible at: https://www.dailysabah.com/business/defense/baykar-becomes-top-exporter-in-turkeys-defense-aerospace-sector

advances into UCAV technology. Following the Iran-Iraq conflict, Iran was unable to access the world market, forcing it to rely on less expensive, locally created technologies and asymmetric methods. Furthermore, the United States labeled Iran as a state sponsor of terrorism in 1984, severely limiting its market access and increasing its reliance on local technology. The Mohajer-1, along with the Ababil-1, were early developments in Iranian unmanned aircraft technology. During the war with Iraq, they were employed for surveillance[1].

PHOTO 4

Iranian Qods Mohajer-6 Drone

[1] Michael Rubin, A Short History of the Iranian Drone Program, **American Enterprise Institute**, August 26, 2020, accessible at: https://www.aei.org/research-products/report/a-short-history-of-the-iranian-drone-program/

Iran developed and expanded its inventory of aerial vehicles by producing them and their versions in-house. The majority of Iran's current drone fleet is manufactured domestically, with some parts bought clandestinely or on the black market. The Iranian drone program is mainly reliant on Western components. Iran has received drone components from over 70 manufacturers from 13 countries and regions, including the Western world and Asia. Eighty-two percent of the components, which include GPS modules and microchips, are manufactured in the United States. Iran has demonstrated mastery of sanctions-busting military technology. It has demonstrated that it can procure foreign components, including as engines, for its drones and other military programs through arms brokers or front firms.

Regardless matter how it obtained its technology, the Iranian regime has a sizable fleet of drones. Fotros, Hamaseh, Kaman, Karrar, Mian, Meraj, Nazir, Raad, Siraf, and Yasir are popular models. These drones are mostly employed for surveillance and offense. In addition, because Iran is prone to earthquakes, the country has experimented utilizing drones for search and rescue purposes. Furthermore, drones are a viable means of blocking the Strait of Hormuz, a threat Iran has made repeatedly in light of punishing sanctions[1].

Iran employs unmanned aerial vehicles (UAVs) to compensate for perceived military inadequacies or limits. UAVs allow Iran to deliver capabilities to regional proxies while complicating the threat situation for regional rivals. Iran has sent drones to Hezbollah in Lebanon and the Houthis in Yemen. Iran provides access to these resources to its network of regional actors, allowing it to influence their behavior[2]. Russia has relied extensively on Iran

[1] SNEHESH ALEX PHILIP, Why Iran's drone programme is a 'triumph' – Harsh sanctions, western components & simple designs, The Print, 23 January, 2023, accessible at: https://theprint.in/defence/why-irans-drone-programme-is-a-triumph-harsh-sanctions-western-components-simple-designs/1326076/

[2] Delma Joseph and Preetish Kamat, The Implications of Drone Proliferation in The Geopolitics Of The Middle East, **Op.Cit**

for unmanned aerial vehicles (UAVs) and direct strike bombs, such as the Shahed-131 and Shahed-136, to use against Ukraine. This has prepared the path for deeper defense cooperation between the two countries, with Iran expecting Russian Sukhoi Su-35 multi-role fighters in exchange[1].

Iran's greatest exports were long-range Shahed-136 suicide drones and shorter-range Mohajer-6 attack drones delivered to Russia for use in Ukraine commencing in August 2022. In other areas of conflict, Iran sold drones to Ethiopia in 2021 for use against Tigrayan insurgents. In 2014, it began a covert campaign to supply Yemen's Houthi rebels with unassembled drones, drone components, and know-how for use against a Saudi-led coalition. Sudan used Iran's Ababil-3 against the Sudan People's Liberation Movement and other rebels in Darfur as early as 2008.

MAP 2

Export destinations of Iranian drones

[1] Seth J. Frantzman, Iran's export of drones to Russia will lead to more proliferation and threaten US partners, Atlantic Council, November 18, 2022, accessible at: https://www.atlanticcouncil.org/blogs/iransource/irans-export-of-drones-to-russia-will-lead-to-more-proliferation-and-threaten-us-partners/

- **Source: Garrett Nada, Explainer: Iran's Drone Exports Worldwide, The Iran Primer, United States Institute for Peace, June 12, 2023, accessible at: https://iranprimer.usip.org/blog/2022/nov/16/explainer-iran%E2%80%99s-drone-exports-worldwide**

Iran has also offered the technology for partners to manufacture drones on their own. Tajikistan constructed a plant in May 2022 to produce Iran's Ababil-2 spy and assault drones. Venezuela began building Mohajer-2 surveillance drones around 2010. Iran and its allies were assembling drones in Syria by 2021.

Major General Yahya Rahim Safavi, a former Revolutionary Guard commander named senior counselor to the Supreme Leader, alleged on October 18 that by 2022, Iran had been approached by more than 20 countries, including Algeria, Armenia, and Serbia, about acquiring drone technology. Since 2004, Iran has also provided drones or drone technology to

proxies such as Lebanon's Hezbollah, Kataib Hezbollah and other Hashd al Shaabi forces in Iraq, Yemen's Houthis, and Hamas in Gaza[1].

[1]- Garrett Nada, Explainer: Iran's Drone Exports Worldwide, **The Iran Primer, United States Institute for Peace**, June 12, 2023, accessible at: https://iranprimer.usip.org/blog/2022/nov/16/explainer-iran%E2%80%99s-drone-exports-worldwide

CHAPTER 5: MANUFACTURE EFFORTS DRONES IN ARAB STATES

5.1. OVERVIEW

The global drone industry has been experiencing rapid growth and technological advancement in recent years. Arab countries, too, have taken a keen interest in this burgeoning sector. With an aim to diversify their economies and reduce their dependence on oil, these nations are investing in the development and manufacturing of drones.

Arab countries have long recognized the necessity to diversify their economies beyond the oil and gas sector. With fluctuating oil prices and environmental concerns, the drive to explore new economic avenues has never been more pronounced. Drones offer a unique opportunity to embrace technological innovation and create jobs in cutting-edge industries.

The Arab world is rising to the occasion, diversifying its economies by investing in drone manufacturing efforts. The opportunities presented by this burgeoning industry are not only economic but also strategic, offering nations the chance to bolster their security and technological capabilities. As these countries continue to nurture their drone manufacturing ecosystems, they are poised to play a significant role in shaping the future of the global drone industry.

With the right policies, investments, and partnerships, Arab countries can continue to soar high in the world of drones. Arab nations such as Egypt, Saudi Arabia, and the United Arab Emirates (UAE) are rapidly developing their own UAV fleets.

5.2. UAE: MANUFACTURE DRONES SUCCESS STORY

The United Arab Emirates (UAE) has emerged as a leader in the Arab world's drone manufacturing efforts. The country is home to several prominent drone manufacturers and has hosted numerous international drone expos and competitions. Companies like Strata Manufacturing and Edge Group are making significant strides in the development of both military and civilian drones. The UAE government's investments in research and development have facilitated the growth of a robust ecosystem around drone manufacturing.

Because of the UAE's geographical location in the Arabian Gulf, its conflict with the Houthis in Yemen, and its participation in Libya, Abu Dhabi has prioritized the development of robust, dynamic military capabilities. Using technological know-how, strong finances, and expanding military and security ties, the UAE established a thriving drone sector that gives Abu Dhabi with regional strategic depth. The UAE has looked to China as a trustworthy provider of drone technology in this quest.

For example, the UAE purchased five Wing Loong I drones from Beijing in 2011 and the Wing Loong II in 2017. In addition, Abu Dhabi purchased 500 Blue Arrow-7 missiles to arm the Wing Loong II drones, which have been seen on battlefields in Libya and Yemen. Because of the UAE's prominence as a technology hub, the Emirates were able to develop commercial drone systems, which subsequently fed into the UAE's military drone expansion. The UAE prioritizes drone technology and has created a number of non-military initiatives to aid its growth, such as the UAE Drones for Good Award, which has drawn over 1,800 contestants from across the world.

The Abraham Accords have expanded the UAE tech industry's possibilities, particularly in the field of drones. Israel aided Abu Dhabi in bridging the drone gap with Turkey. Since the 1980s, Israel has been at the forefront of the drone industry, becoming the world's largest

exporter of this technology and securing agreements with global and regional powers such as Azerbaijan, the United Kingdom, France, Germany, Poland, the Netherlands, Spain, and India. Fearing Turkish and Iranian drones, the UAE and Israel collaborated to develop UAV fleets.

Edge and Israel Aerospace Industries have agreed to work together to develop a fully autonomous counter-UAV system "supported by 3D radar, communications intelligence technology, and electro-optics integrated into a unified command-and-control system". Following the signing of the Abraham Accords, the UAE and Israel are now forming a tech alliance to capitalize on their respective comparative advantages: Israel's supremacy in drone and anti-drone technologies and the UAE's financial clout and expertise in scaling digital capabilities[1].

In 2020, Edge, Abu Dhabi's defense business, launched the first drone produced in the UAE on Sunday at the Umex exhibition in the capital. Adasi, a subsidiary of Edge, designed Garmousha, a vertical take-off and landing (VTOL) drone that mimics a helicopter, in collaboration with the General Headquarters of the UAE Armed Forces.

The autonomous aircraft can transport payloads weighing up to 100 kilos and has a range of 150 kilometers and six hours of flight duration. According to the business, the helicopter promises to give flexibility by allowing military to save human helicopters for vital missions.

[1] Mohammed Soliman, Drones are re-engineering the geopolitics of the Middle East, **The Middle East Institute**, March 7, 2022, accessible at: https://www.mei.edu/publications/drones-are-re-engineering-geopolitics-middle-east

The Garmousha drone can also identify gas pipeline leaks, assess infrastructure, and assist with search and rescue operations[1].

Beside Garmousha, there are 6 other types of drones, produced by the Emirati company Edge: “AIR TRUCK”, “QX-4 ISR”, “QX-5 VTOL”, “QX6-50 CARGO UAV”, “SHADOW 25” and “SHADOW 50”. The “AIR TRUCK” is a powerful logistics UAV with a 500 kg payload capacity that can operate via pre-programmed mission or live operator, making it ideal for higher-risk or more dangerous missions. Suitable for military, security and civilian deployment, cargo is transported via a custom-designed Air Box that ensures rapid cargo loading and unloading.

The “QX-4 VTOL” aerial vehicle is a modern tool for advanced intelligence, surveillance and reconnaissance (ISR) missions, featuring an extended endurance of up to 13 hours. With advanced autopilot and communication systems, the QX-4 can carry payloads of up to 7 kg, offering multiple mission scenarios to border control and military forces. The system is easily transportable by light vehicle and delivers a stand-off range of 150 km.

The “QX-5 VTOL” aerial vehicle is a modern tool for advanced intelligence, surveillance, and reconnaissance (ISR) missions, featuring an extended endurance of up to 16 hours. With advanced autopilot and communication systems, the QX-5 can carry payloads of up to 25 kg, offering multiple mission scenarios to border control and military forces.

The “QX6-50” is a swift, medium size, mid-range, unmanned Helicopter capable of transporting payloads up to 50kg, which features advanced autopilot and communication

[1] UAE's first locally-made drone unveiled at Umex, The National News, Feb 24, 2020, accessible at: https://www.thenationalnews.com/uae/government/uae-s-first-locally-made-drone-unveiled-at-umex-1.983259

systems. With an endurance of up to 3.5 hours, delivery radius of 200km, and the ability to land on multiple terrains, including sand and seagoing vessels, the QX6-50 facilitates effortless cargo transfers to and from remote and hard-to-access locations.

The "HALCON SHADOW 25" loitering unmanned aerial vehicle (UAV) system provides defence forces with powerful, rapid-strike kamikaze munition capable of delivering a precision strike against fixed targets.

Featuring advanced guidance capabilities and onboard video navigation, the SHADOW 25 system has a cruising speed of 400 km/hr, creating new opportunities to swiftly neutralize stationary enemy targets with a powerful 25 kg payload, even those located up to 295 km away.

The "HALCON SHADOW 50-P" loitering unmanned aerial vehicle (UAV) system provides defence forces with a powerful, long-endurance, loitering munition that delivers precision strike capabilities against fixed targets[1].

EDGE, an Abu Dhabi-based defense consortium comprised of 25 Emirati enterprises, was created three years ago but is expected to sell $4.8 billion in weaponry to the UAE government by 2020. According to the Stockholm International Peace Research Institute, the group was placed 23rd among the top 100 arms-producing and military services in the world in 2020[2].

5.3. KSA: LOCALIZATION ATTEMPTS OF DRONES INDUSTRIES

[1] UAV, **Edge**, accessible at: https://edgegroup.ae/solutions?brand=adasi&category=uav

[2] Global arms industry: Sales by the top 25 companies up 8.5 per cent; Big players active in Global South, **the Stockholm International Peace Research Institute (SIPRI)**, 7 December 2020, accessible at: https://www.sipri.org/media/press-release/2020/global-arms-industry-sales-top-25-companies-85-cent-big-players-active-global-south

Saudi Arabia is also betting big on drone manufacturing. The country's crown jewel, the Saudi Arabian Military Industries (SAMI), has formed strategic partnerships with global defense giants to establish a strong drone manufacturing infrastructure. This endeavor aims to bolster the Kingdom's defense capabilities while supporting the growth of a nascent drone industry. SAMI's investments have led to the development of various drone platforms, including surveillance and reconnaissance drones.

The current Saudi foray into the drone sector is a result of Vision 2030 and the kingdom's geopolitical threats. Technology is critical to Vision 2030's economic growth and diversification goals. The monarchy has prioritized technological investment and the development of commercial drones, which will enable Riyadh to compete with the UAE and promote itself as a burgeoning innovation hub. The Center for the Fourth Industrial Revolution (C4IR) in Saudi Arabia, in particular, is focused on heavy-lift drone design, production, and operation. The kingdom seeks to support international transport providers as well as develop the regulatory structures of the business[1].

The Iranian drone strikes on the Saudi Aramco oil processing complex at Abqaiq in 2019 raised awareness of the dangers of drones and the urgent necessity for Riyadh to develop drone and anti-drone capabilities. Following years of geopolitical difficulties with Turkey, Ankara announced that Riyadh intended to purchase Turkish armed unmanned aerial vehicles (UAVs), which had previously contributed to military triumphs in Syria, Libya, and Nagorno-Karabakh. Intra Defense Technologies and Advanced Electronics Company, two Saudi manufacturers, have begun co-producing a Turkish-made, medium-altitude, long-endurance Karayel-SU drone under license from Vestel Savunma. The move is part of a

[1] Mohammed Soliman, Drones are re-engineering the geopolitics of the Middle East, **Op.Cit**.

Saudi push to develop a local drone industry using Turkish drone skills. Two Saudi businesses have agreed to collaborate on the production and development of the Sky Guard drone for operational deployment. Riyadh's financial heft and alliances will aid in the development of domestic drones[1].

Furthermore, two memorandums of agreement were signed between the Saudi National Company for Mechanical Systems, Roketsan, and Aselsan—all of which are prominent Turkish defense firms. These Memorandums of Understanding seek to localize the manufacturing of drone munitions and optical sensors in Saudi Arabia[2].

The King Abdulaziz City for Science and Technology (KACST) stated in June 2017 that the first stage of a drone factory in Riyadh is nearly complete. The plant is expected to produce drones for military and public use, scientific research, urban planning, and security.

The Saqr 1 drone, built of carbon and glass fiber and fitted with a satellite communications system, is one of the drones that will be manufactured at the facility. The drone has a range of 2,500 kilometers and can fly for 24 to 48 hours. KACST has also created three medium-sized drones, the Saqr 2, 3, and 4. The flats were first developed in 2012, with 38 completed as of August 2014.

The Saqr 2 can fly for eight hours at a speed of 120 km/h at an altitude of 5,000 meters, while the Saqr 4 can carry up to 5 kilograms. The Saqr 4 can fly for five to six hours and reach a

[1] Saudi Arabia in pact with Turkey's Baykar Tech to localise drone manufacturing, Reuters, August 7, 2023, accessible at: https://www.reuters.com/world/middle-east/saudi-arabia-pact-with-turkeys-baykar-tech-localise-drone-manufacturing-2023-08-06/

[2] Saudi-Turkey Pact Targets Localization of Drone Manufacturing, **The Media Line**, , August 8, 2023, accessible at: https://themedialine.org/headlines/saudi-turkey-pact-targets-localization-of-drone-manufacturing/

maximum speed of 120 kph at an altitude of 5,000 meters. All of the models have cameras for aerial photography[1].

Advanced Communications and Electronics Systems Co. struck an agreement with China Electronics Technology Group Corp. in March 2022, with the two businesses declaring their collaboration during the World Defense Show in Riyadh, which was held March 6-9.

The Aerial Solutions joint venture will see CETC construct a research and development facility as well as a team that will manufacture various types of UAV systems. These systems will incorporate communications, flight control, camera, radar, and wireless detection.

The new company will also work on electric-powered vertical takeoff and landing drones, anti-drone technologies, analytics, helicopter products, and radar systems. This is not the first time China and Saudi Arabia have signed an agreement to allow the kingdom to purchase Chinese unmanned aircraft systems. Saudi Arabia ordered Chinese-made Wing Loong II drones in 2017.

China Aerospace Science and Technology Corp. previously announced a collaboration with King Abdulaziz City for Science and Technology to establish a manufacturing plant for the CH drone class in Saudi Arabia[2].

5.4. EGYPT: ATTEMPTS TO CATCH UP WITH THE DRONES INDUSTRY

[1] First stage of Saudi drone factory complete: KACST, **Arab News**, 17 June 2017, accessible at: https://www.arabnews.com/node/1116351/amp

[2] Chinese and Saudi firms create joint venture to make military drones in the kingdom, **Defense News**, Mar 9, 2022, accessible at: https://www.defensenews.com/unmanned/2022/03/09/chinese-and-saudi-firms-create-joint-venture-to-make-military-drones-in-the-kingdom/

Egypt has also joined the drone manufacturing race, with a focus on both military and civilian applications. The country's military has been deploying domestically-produced drones for reconnaissance and surveillance missions, reducing reliance on foreign suppliers. In the civilian sector, drones are being used for agricultural monitoring, infrastructure inspection, and even tourism promotion.

Egypt was one of the first Arab countries to field reconnaissance UAVs in the late 1980s. The effective employment of UAVs by Israel during the 1982 Lebanon War was undoubtedly recognized in Cairo, potentially fueling Egyptian efforts to obtain a similar capacity. Around the same time, the US Teledyne Ryan business, in collaboration with Scaled, began developing a drone specifically customized to Egyptian needs. Egypt ended up with a very advanced stealthy jet-powered surveillance drone capable of snapping images along a pre-planned route, officially called as the TR 324 but more widely known as the Scarab.

After completing its mission, the TR 324 is recovered by a parachute using a RATO booster. The Egyptian Air Force (EAF) received 59 TR 324s in all, but only nine were ever completed. [1] The remaining fifty examples appear to have been reserved for wartime usage, with the nine uncrated examples being sufficient for training and peacetime operations. According to reports, they flew 65 missions from their home station in Kom Awshim, south of Cairo. It is unknown whether the TR 324 is still in service with the EAF in 2021[1].

Egypt unveiled its first two locally manufactured drones, the EJune-30 SW and Nut, at the Egypt Defence Expo (EDEX 2021), which took place between November 29 and December 2, 2021.

[1] Stijn Mitzer and Joost Oliemans, The Middle East's Game of Drones: Egypt's UAV Arsenal, **Oryx**, December 28, 2021, accessible at: https://www.oryxspioenkop.com/2021/12/the-middle-easts-game-of-drones-egypts.html

Nut is named after Nut, the ancient Egyptian sky goddess. It is the first of two drones to be announced at EDEX 2021. It was created in collaboration with the Military Technical College by the Arab Organization for Industrialisation (AOI). The drone was entirely designed and manufactured in Egypt. The maximum payload capacity of Nut is 65 kg. Nut has the ability to fly for up to 14 hours. The drone can fly at a maximum altitude of 5,000 meters. Nut has a top speed of 180 km/h. It is outfitted for observation, training, and pursuing targets. Anti-drone weaponry is installed on the drone. Nut is capable of flying in satellite mode.

SW-30 EJune, it is the second of two drones announced, and it has far more sophisticated capabilities. It was created in collaboration with the Egyptian Ministry of Military Production and the Industrial Complex Engineering Robots. The drone was entirely built in Egypt. The EJune-30 SW has a maximum payload capacity of 260 kg. The EJune-30 SW has a flight time of up to 24 hours. The drone can fly at a maximum altitude of 7,000 meters. It has a top speed of 260 km/h. The EJune-30 SW is outfitted for surveillance and target pursuit. Combat actions can also be carried out by the drone[1].

Egypt increased its drone capabilities by purchasing Chinese drones such as the ASN-209 reconnaissance UAV in addition to American-made reconnaissance drones. Cairo Wing Loong I unmanned combat aerial vehicles were also sold by Beijing. Egypt and China worked together to adapt the Wing Loong I to Cairo's counter-terrorism strategy in Sinai, outfitting it with the ability to identify and track moving vehicles as well as improvised

[1] Factbox: What are the 1st Egyptian-made drones able to do?, **Ahram Online**, 5 Dec 2021, accessible at: https://english.ahram.org.eg/NewsContent/1/1237/443842/Egypt/Defence/Factbox-What-are-the-st-Egyptianmade-drones-able-t.aspx

explosive devices and roadside mines. The Egyptian Navy has purchased the UAE-built al-Saber UAV, which has benefited from the UAE's drone success story.

Cairo opted to build its own drone fleet in order to compete with burgeoning regional drone powers, primarily Turkey. Cairo obtained manufacturing permits from partners and friends for reconnaissance and warfare drones. Egypt, for example, has obtained ideas from Belarus and was in talks with Italy. Cairo unveiled its first locally built reconnaissance drone during the 2021 Egypt Defence Expo. The drone, dubbed "Nut" after the ancient Egyptian goddess of the sky, is the outcome of Emirati-Egyptian collaboration. Cairo also displayed the June-30 SW, which is likely based on the UAE-produced Yabhon United 40, indicating a developing strategic relationship in UAV manufacture between Cairo and Abu Dhabi. Egypt is developing a third domestic drone for intelligence, surveillance, and reconnaissance duties, the Thebes-30 UAV.

Meanwhile, Cairo will continue to work on creating a robust drone industry that might position Egypt as a drone power capable of projecting influence in several Middle Eastern strategic theaters, similar to Iran and Turkey[1].

5.5. MAGHREB: LIMITED ATTEMPTS TO MANUFACTURE DRONES

Algeria and Morocco, two significant Maghreb nations, have begun the road of drone production, but with modest success. While both countries recognize the potential of unmanned aerial vehicles (UAVs) in a variety of sectors, obstacles such as regulatory frameworks, investment constraints, and a focus on specific industries have contributed to the relatively slow growth of the drone manufacturing sector in these countries.

[1] Mohammed Soliman, Drones are re-engineering the geopolitics of the Middle East, **Op.Cit**.

While Algeria and Morocco have shown interest and potential in drone manufacturing, the industry's growth in these nations is hampered by a number of hurdles. Algeria's focus on defense applications has hampered the diversification of its drone manufacturing activities, while Morocco, despite progress in several industries, faces challenges in general adoption and legal clarity.

Algeria is notoriously secretive when it comes to disclosing information about its military acquisitions and present weapon system inventory. As a result, it is all the more astonishing that a great deal of information about the sorts of unmanned aerial vehicles (UAVs) purchased and operated by Algeria is publicly available. This indicates a vast inventory of (armed) drones sourced from China, the United Arab Emirates (UAE), South Africa, and several other countries. Algeria has also developed various types of indigenous drones in recent years. These efforts, while promising, have yet to produce a working system. The majority of Algeria's UAVs are now based in the Ain Oussera air base, which is located 200 kilometers south of the city Algiers.

Algerian interest in UAV operations is thought to have begun in the mid-1990s, leading to the purchase of ten Denel Dynamics Seeker IIs from South Africa a few years later. For a long time, these drones were the only form of UAV in Algerian service. Nonetheless, the Seeker IIs outperformed Morocco's R4E SkyEyes, while neighboring Libya did not fly any UAVs for a long time. New advances in the 2010s rekindled Algerian interest in acquiring additional UAV capabilities, although it would take until the late 2010s for new systems to be purchased[1].

[1] Stijn Mitzer and Joost Oliemans, Algiers Calling: Assessing Algeria's Drone Fleet, **Oryx,** December 02, 2021, accessible at: https://www.oryxspioenkop.com/2021/12/algiers-calling-assessing-algerias.html

This time, Algiers went to China for unmanned combat aerial vehicles (UCAVs). The CH-3A type was initially bought from China Aerospace Science and Technology Corporation (CASC), and was later complemented by the more capable CH-4B from the same company. Unfortunately, there is little to no information available about the numbers received by Algeria. What is known is that the Algerian Air Force lost three CH-4Bs in a couple of months due to crashes. Two of these crashes occurred during the system's experimental phase in Algeria. Surprisingly, this did not appear to be enough to deter Algeria from proceeding with the purchase of the CH-4B[1].

Around the same time that the Chinese-made UCAVs entered service, the Algerian Air Force acquired a couple of unusual drone types from UAE-based drone maker Adcom Systems. The Yabhon Flash 20 and Yabhon United 40, known in Algeria as the El-Djazair-55 and El-Djazair-54, are believed to have entered service in 2018. Algeria alleges that the drones were developed domestically rather than purchased straight from Adcom[2]. What they lack in appearance, they more than make up for in payload capacity, with up to ten hardpoints for Nimrod air-to-ground missiles or 120mm free-fall mortar rounds. The United 40 can also be outfitted with a six-unit rotating dispenser located in the fuselage or a synthetic-aperture radar (SAR).

Algeria has a modest R&D capability for military-grade drones in addition to constructing Emirati UCAVs of the Yabhon series. The majority of the country's ongoing drone initiatives

[1] Chinese CH-4B Drones Keep Crashing In Algeria For Technical Fault, Global Defense Corp, March 11, 2021, accessible at: https://www.globaldefensecorp.com/2021/03/11/chinese-ch-4b-drones-keep-crashing-in-algeria-for-technical-fault/

[2] Adcom adds to Algerian force, Times Aerospace, accessible at: https://www.timesaerospace.aero/features/defence/adcom-adds-to-algerian-force

are managed by the Research Center in Industrial Technologies (CRTI), which has designed at least five Amel series UAVs. Although most of these drones are unlikely to see active service with the Algerian military, the expertise acquired in their development could one day lead to the development of a fully indigenous U(C)AV. Alternatively, Algiers might bypass the design process by securing a license to manufacture alternative designs from the UAE, but at the expense of a fully indigenous local technology base.

Algeria was reported to have placed an order for 24 Wing Loong II UCAVs from China in September 2021. Because Algeria rarely speaks on armament purchases, the first proof that such a procurement occurred will very certainly come when the systems are discovered on an Algerian air base. Meanwhile, the Algerian Air Force may continue to assemble additional Yabhon Flash 20 and United 40 UCAVs while simultaneously investing more resources in developing indigenous systems. It remains to be seen if this will be adequate to stay up with advancements in Morocco, and the procurement of more drone capabilities such as loitering munitions does not appear unlikely[1].

In November 2023, Algerian Army chief Gen. Said Chanegriha discussed in Beijing a diverse military partnership with the Chinese military industry in the field of drones and the management of defense and security systems. Supervisors at the Algerian defense sector plan to launch a partnership with the company to develop the assembly, research and training activities of the emerging Algerian military industry in the field of drones. The goal of this

[1] Stijn Mitzer and Joost Oliemans, Algiers Calling: Assessing Algeria's Drone Fleet, **Op.Cit**.

endeavor is to lead the North African and Arab Maghreb regions in the use and development of drones[1].

Morocco has joined the club of drone makers as a result of a new agreement with Israel under which Morocco will build Israeli war drones. Under Israeli supervision and expertise, the Royal Moroccan Armed Forces would construct two factories to manufacture military drones. This will enable the monarchy to produce advanced drones at a lower cost than it presently purchases from China and Turkey.

According to a military deal inked between Morocco and Israel in July, Tel Aviv is committed to providing drone manufacturing technologies to Rabat. With Tel Aviv's assistance, these drones will be produced at a lesser cost at two Moroccan military stations.

According to Israeli military officials, the war drones, which will be constructed in Morocco within months, will allow for surveillance missions, remote intelligence gathering, and combat involvement. Morocco purchased drones from numerous nations, including China, Turkey, France, and Israel, forming an actual fleet, possibly the most advanced in North Africa. However, Rabat's ambition is no longer confined to purchasing; it now hopes to manufacture drones on Moroccan territory with the assistance of Israel[2].

Morocco has increased its drone imports in recent years, owing to tensions with Algeria and Western Sahara, which it believes to be an important part of its territory. It has purchased drones from China, Turkey, France, and Israel, forming a veritable fleet that is perhaps the

[1] Algerian Army Seeks China's Expertise in Drone Manufacturing, Asharq Al Awsat, 15 November 2023, accessible at: https://english.aawsat.com/arab-world/4669446-algerian-army-seeks-china%E2%80%99s-expertise-drone-manufacturing

[2] With the help of Israel, Morocco is the first African country to enter the drone manufacturers club, **Middle East Monitor**, October 15, 2022, accessible at: https://www.middleeastmonitor.com/20221015-with-the-help-of-israel-morocco-is-the-first-african-country-to-enter-the-drone-manufacturers-club/

most advanced in North Africa. According to The Wall Street Journal, the United Kingdom has signed an arrangement with two top Israeli businesses to produce both attack and defense drones. Morocco's establishment of two drone factories would make the North African country the continent's top drone manufacturer.

These drones will be constructed at two Moroccan military bases at a lesser cost thanks to Tel Aviv's assistance. Morocco will soon join the club of drone manufacturing countries as a result of this. Morocco's decision to open up to numerous poles for investment in the drone sector within the Kingdom is part of a policy of diversification and strategic partners' interests to expand the Royal Armed Forces' military arsenal in order to prevent any infiltration by the Polisario insurgency. This investment will also provide a chance for the Kingdom to improve its military manpower and military industry. The partners' diversification strategy also allows Morocco to build its internal immunity[1].

[1] Enrique Fernández, Morocco will be the first African country to manufacture drones, **Atalayar**, Jun 6, 2023, accessible at: https://www.atalayar.com/en/articulo/politics/morocco-will-be-first-african-country-manufacture-drones/20221014123446158639.html

CHAPTER 6: DRONES USAGE BY “VNSAs” IN “MENA”

6.1. OVERVIEW

The Middle East region has a complex map of violent non-state actors (VNSAs). Violent non-state actors use drones to carry explosives or conduct reconnaissance. According to intelligence analysis, the main groups of drone users in the middle east are violent non-state actors. Drones are used by Iran-backed militia groups in Syria, Iraq, and Yemen to target local military troops and American military sites. The three major factions deploying drones to target Israeli military and American leaders are Hamas, Hezbollah, and Houthis. Based on an examination of intelligence data, the second significant category of drone users is jihadist terrorist groups.

The Middle East has witnessed a proliferation of drones employed by violent non-state actors, reshaping the dynamics of conflict in the region. These groups, ranging from insurgent organizations to terrorist factions, have increasingly harnessed the capabilities of drones for strategic and tactical purposes. One prominent use is for surveillance, allowing these actors to gather intelligence on enemy positions, monitor military movements, and identify vulnerabilities.

Drones also serve as effective propaganda tools, enabling groups to document and disseminate their activities, showcasing their military prowess and instilling fear among adversaries and local populations. Another significant application is the delivery of small-scale munitions, transforming drones into improvised explosive devices (IEDs) capable of striking targets with precision.

This use of drones grants non-state actors a cost-effective and asymmetric advantage against conventional military forces. Moreover, the Middle East's vast and rugged terrain provides an ideal environment for drone operations, offering cover and concealment for launching and controlling these unmanned aerial vehicles. As a result, the strategic landscape in the region has evolved, with drones becoming integral to the arsenals of non-state actors seeking to assert influence and challenge established power structures.

The increasing sophistication of drone technology poses a growing challenge for regional security, requiring nations to develop comprehensive counter-drone strategies to mitigate the threats posed by these unmanned platforms in the hands of violent non-state actors.

This chapter explores the use of drones by four Middle Eastern non-state groups: Hezbollah, Hamas, the Houthi Movement, the Islamic State (IS). Unlike other violent non-state actors, these four have showed a willingness to engage in tactical and/or technological innovation in the use of drones, as well as a long-term engagement with drone technology and the ability to construct drone infrastructure.

6.2. HEZBOLLAH

Hezbollah first experienced armed drones when its general secretary was slain by Israel in an air attack piloted by a drone in 1992.95 Shortly afterwards, Hezbollah apparently discovered ways to use Israeli drone flights to their advantage: in 1997, Hezbollah intercepted and ambushed a Shayetet 13 commando, killing twelve people.

By November 2004, Hezbollah had acquired its own drones, the Iranian Mersad-1, and successfully flown one into Israeli airspace.

During the 2006 war with Israel, there was a frenzy of activity, most notably the flight of explosive-laden Ababil drones into Israel (and then shot down). At the time, reports wrongly ascribed an attack on the Israeli corvette INS Hanit to an explosive drone; this was later amended to a missile attack.

After a six-year hiatus, Hezbollah resumed reconnaissance flights over Israeli land, the majority of which were intercepted. In 2016, a drone attributed to Hezbollah or Russia flew over Israel Defense Forces (IDF) maneuvers and eluded several interception attempts. Meanwhile, additional Hezbollah flights flew perilously close to the Dimona nuclear plant, obtaining footage that was apparently later shared with Iranian officials on one occasion (in 2012).

In parallel, Hezbollah used drones to attack enemy militias in Syria, first against Jabhat al-Nusra locations in 2014, and later (from 2016 forward) against IS forces. Hezbollah used small, privately purchased quadcopters to deliver Chinese-made submunitions in these later strikes against IS, marking a shift away from the largely Iranian-made military drones it had previously used[1].

In its current status, the Hezbollah drone program appears to be essentially dormant, despite repeated interceptions of drones in Israel. However, the group's rumored drone capabilities remain a major cause of anxiety in Israel. In 2021, for example, the Israeli research institute ALMA estimated that Hezbollah owned roughly 2,000 drones, raising concerns that

[1] Yannick Veilleux-Lepage and Emil Archambault, A Comparative Study of Non-State Violent Drone use in the Middle East, **Op.Cit**. p. 23.

Hezbollah may overwhelm Israel's air defenses and cause widespread losses in the event of a major battle[1].

In November 2004, Hezbollah launched its first unmanned aerial vehicle (UAV) or drone into Israeli airspace for reconnaissance objectives, catching Israeli intelligence off guard. A Mirsad-1 drone (an updated version of the early Iranian Mohajer drone used for reconnaissance of Iraqi troops during the Iran-Iraq War in the 1980s) flew south from Lebanon into Israel, hovered for about 20 minutes over the Western Galilee town of Nahariya, and then returned to Lebanon before the Israeli air force could intercept it[2].

Hezbollah maintains a tight relationship with Iran's Islamic establishment. The US State Department estimated in its 2020 report that Iran sponsored Hezbollah to the tune of $700 million, and the group raises another $300 million on its own, however details on where that money comes from and where it goes are scant.

Iran has also supplied Hezbollah with thousands of rockets and missiles (more than 100,000 in all), as well as other equipment including as anti-ship, anti-aircraft, and anti-armor systems. Hezbollah also has a number of drones that it created with the assistance of Iran, and Iran has also supported Hezbollah with precision systems[3].

Hezbollah's drone fleet looks to be a mix of foreign - Iranian - models and locally modified vehicles, as well as commercially obtained quadcopters. As a result, Hezbollah has showed

[1] Tal Beeri, 'Iran's "UAV Army" – A Global Threat', **ALMA Research and Education Center**, December 2021, accessible at: https://israel-alma.org/wp-content/uploads/2021/12/Irans-UAV-Army-–-A-Global-Threat.pdf

[2] Milton Hoenig, Hezbollah and the Use of Drones as a Weapon of Terrorism, Public Interest Report, Spring 2014 – Volume 67 Number 2, accessible at: https://uploads.fas.org/2014/06/Hezbollah-Drones-Spring-2014.pdf

[3] DANIEL L. BYMAN, HEZBOLLAH'S DILEMMAS, **FOREIGN POLICY AT BROOKINGS**, POLICY BRIEF, NOVEMBER 2022, accessible at: https://www.brookings.edu/wp-content/uploads/2022/11/FP_20221110_hezbollah_dilemmas_byman.pdf

an enhanced ability to use medium-altitude big drones, such as the Shahed-129/Ayoub Iranian drone, which was likely inspired by the Israeli Hermes 450, alongside small, adapted quadcopters. This program has benefited from considerable infrastructure: in 2015, Jane's Defence Weekly reported the development of a runway in the Bekaa valley used to launch larger drones, while other sources suggest that Lebanese airports were utilized for this purpose[1].

Hezbollah utilized drones in 11 strikes from Lebanon against Israel, but Israeli defensive systems intercepted them in 2021 and 2022. Hezbollah, for example, deployed Iranian-supplied aerial surveillance drones and launched three Iranian-made drones in June 2022 to strike Israeli gas facilities[2].

In comparison to the severity of the perceived threat, Hezbollah's real drone activities remain relatively quiet. As a result, Hezbollah appears eager to demonstrate advanced drone capabilities while refraining from utilizing drones on a big scale. Hezbollah uses rockets (and drones) to primarily wage psychological warfare, threatening Israel's northern settlements, inciting population shifts, and capitalizing on Israeli fears of civilian losses[3].

Hezbollah has been deploying unmanned aerial vehicles (UAVs) since the 1990s and has employed them in Syria as well as against Israel. Even before the Second Lebanon War in

[1] Yannick Veilleux-Lepage and Emil Archambault, A Comparative Study of Non-State Violent Drone use in the Middle East, **Op.Cit**. p. 24.

[2] Mahmut Chengiz, Perspective – Drone Proliferation in the Conflict Zones: Who are the Suppliers and Users?, **Small War Journal**, 28 Oct, 2023, accessible at: https://smallwarsjournal.com/blog/perspective-drone-proliferation-conflict-zones-who-are-suppliers-and-users

[3] Massaab Al-Aloosy, 'Deterrence by Insurgents: Hezbollah's Military Doctrine and Capability Vis-à-Vis Israel', Small Wars & Insurgencies 33, no. 6 (August 2022): 999–1016, accessible at: https://doi.org/10.1080/09592318.2022.2057750

2006, the group sent drones into Israel, and Hezbollah launched many armed drones into the nation during the conflict.

Hezbollah "most likely" possesses advanced UAV models including the Mohajer, Shahed, and Samed (KAS-04), Karrar, and Saegheh. It also has dozens of smaller civilian drones manufactured by China that are used for photography as well as carrying and dropping munitions.

Since 1984, Iran has been developing its "UAV Army," and the fleet not only has a huge range of over 2,000 kilometers, but also "very advanced development and operational capabilities."

Hezbollah, the IRGC, and other Shi'ite militias are also participating in Syria, launching UAV attacks from multiple air bases.In Lebanon, Hezbollah maintains a launch location near Aiiyat in the Beqaa Valley, as well as a runway few hundred meters north of Aiiyat on the outskirts of Baalbek[1].

6.3. HAMAS

Small, tactical drones, which the group employed in complex and multifarious ways during the invasion, have been a significant component in the last round of hostilities between Israel and Hamas, which began on October 7, 2023. The first wave of strikes used unmanned aircraft systems (UAS) to destroy Israeli observation towers, cameras, and communications. The initial challenge was intended to blindside, deafen, and perplex the Israeli defense.

[1] Anna Ahronheim, Hezbollah has some 2,000 unmanned aerial vehicles, **Jerusalem Post**, December 22, 2021, accessible at: https://www.jpost.com/middle-east/article-689470

Hamas also used UAS to drop explosives on tanks, evidently knowing how to target them for crippling, as well as soldiers and emergency responders. Drone swarms were also used to assault naval vessels and energy facilities.

PHOTO 5

Hamas' Drone in Gaza

- **Source: Hamas' unmanned aerial vehicles (UAV or drone) flying above Gaza City on December 14, 2022. (Photo by Majdi Fathi/NurPhoto via Getty Images.**

Along with thousands of rockets, the group launched volleys of the Zouari, a new loitering munition (also known as a suicide drone) named after late Hamas engineer and drone pilot Mohammed Zouari. Tactical armed drones were taken from slain raiding groups that stormed across the border. Palestinian Islamic Jihad, one of Hamas' primary regional partners, appears

to have a dedicated drone operations room. Drones have been critical for attaining strategic and tactical objectives since the strikes began, from close and far.

In an unusual move for Violent Non-State Actors, Hamas is pioneering a new combined armaments concept using commercial drones. Multiple units with varied capabilities collaborate in combined arms approaches, boosting the impact of their attack. Drones are an important part of this strategy and consequently a force multiplier. Hamas is displaying its ability to field a multidomain force against a stronger foe by using UAS in concert with and in support of conventional forces and platforms[1].

During the most recent round of hostilities between Israel and Hamas, Israel had to deal with a growing drone threat from the Gaza Strip, not only in the field, but also on social media, where Hamas has posted spectacular films demonstrating its drone tactics and technology. While Israel has previously dealt with Iranian drones, it appears that Hamas has acquired similar technology that allows it to utilize explosive-laden drones.

In 2021, Six armed drones were intercepted by Israel via various means. Several of them were intercepted by IAF fighter jets, while one was intercepted in flight by the Iron Dome system. Unlike the frequently intercepted rockets, these suicide drones were reportedly carrying roughly five kilograms (11 pounds) of explosive payload and were designed to escape the Iron Dome defense system.

These drones, which resemble the Iranian Ababil military drone, have been reported to have been manufactured and built locally by the Izzedine al-Qassam Brigades, Hamas' military

[1] Kerry Chávez, Ori Swed, How Hamas innovated with drones to operate like an army, **Bulletin of the Atomic Scientists**, November 1, 2023, accessible at: https://thebulletin.org/2023/11/how-hamas-innovated-with-drones-to-operate-like-an-army/

branch, and have been dubbed "Shehab." The Iranian HESA Ababil is a low-cost targeted drone with minimal surveillance capabilities and the possibility to be employed as a lingering munition ("suicide" or "kamikaze" drones).

While the engines of the Shehab and Qasef-series drones are comparable, media published by Hamas suggests that Commercial Off-The-Shelf (COTS) engine components are used in their drones, which look to be smaller in size. The drones used by Hamas also contain a visible commercial GPS module that guides them to their target.

Drones as loitering munitions were rarely utilized by Hamas until the most recent escalation, although COTS drones have been used for Intelligence, Surveillance, and Reconnaissance (ISR). Furthermore, recent innovative uses of drones by the Palestinian side include balloons with explosive payloads launched and sent across the border into Israel - a tactic in which the balloons burst and the payload is dropped, potentially bypassing defense infrastructure that focuses on high-speed and highly technical components[1].

The use of 35 "Zouari" drones in the October 7, 2023, attacks was confirmed by Hamas. According to the US State Department's 2020 Country Terrorism Report, Iran provides $100 million to the group each year. Hamas has never denied this, but has claimed that the number is lower.

According to American assessments, Iran's supporters have provided military training, logistical support, and financial assistance to Hamas fighters. However, this information cannot be validated. Some experts assume that Russian military are also participated in

[1] Arison Neo, What do we know about Hamas' drones?, **Israel Hayom**, May 26, 2021, accessible at: https://www.israelhayom.com/2021/05/26/what-do-we-know-about-hamas-drones/

Hamas fighter training. They all get trained in Syria, including Islamic Jihad, Hamas, and others." "It is clear that Russians are involved as trainers with unique experience, according to Ihor Semyvolos, director of the Center for Middle Eastern Studies in Kyiv.

Russia is a Syrian regime ally, although there has been no evidence of direct Russian backing for Hamas. However, according to Israeli journalist Nadav Eyal, Russian weapons were left behind by Hamas fighters at the site of the October 7 strikes. According to Israeli reports, Iran has heavily outfitted the Hamas assault unit Nukhba with Russian-made weapons ranging from Kalashnikov assault rifles to Strela anti-aircraft missiles[1].

7.4. THE HOUTHI MOVMENT

Yemen has been a frequent target of American drone strikes since the beginning of the War on Terror, with armed organizations operating there regularly subjected to long-range operations. In 2015, Saudi Arabia launched a long-range and continuous aircraft bombardment campaign against Houthi troops in support of Yemen's central government.

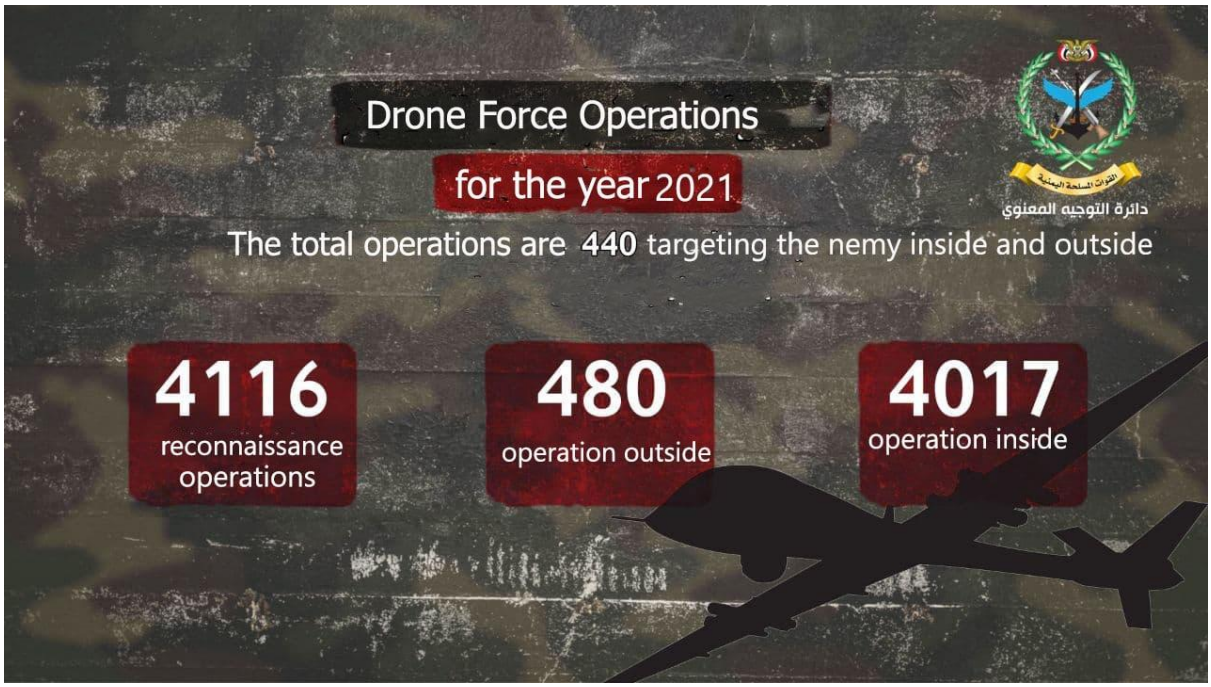
As a result, the Houthi Movement finds itself in a regional situation in which it faces opponents both at home (Yemeni government troops) and at a distance (American, primarily Saudi, forces). The Houthi forces have made extensive use of drones in this context, enabling long-range attacks against distant adversaries. Long-range drones, often produced or designed

[1] Dmytro Kaniewski, Hamas: Learning about drone warfare from the war in Ukraine, **DW**, Oct. 10, 2023, accessible at: https://www.dw.com/en/hamas-learning-about-drone-warfare-from-the-war-in-ukraine/a-67169578

in Iran, have been used by Houthi forces to acquire deep penetration capabilities, often in conjunction with other weaponry systems such as cruise missiles[1].

FIGURE 7

Summary of Houthi Operations, 2021



- **Source: Yahya Sare'e, 'Tweet: Summary of Houthi Operations, 2021', 2 January 2022, https://twitter.com/Yahya_Saree/status/1477745874499514369**

Since at least 2018, Houthi forces have used aerial drones frequently, with a fast increase in the frequency of assaults the following year. The majority of the assaults have occurred in Saudi Arabia, however at least three have targeted the United Arab Emirates, and some have occurred in Yemen itself. Houthi forces evidently intend for both high-impact strikes and a

[1] Yannick Veilleux-Lepage and Emil Archambault, A Comparative Study of Non-State Violent Drone use in the Middle East, **Op.Cit**, p. 33.

high volume of attacks: on 2 January 2022, Houthi spokesperson Yahya Sare'e issued four infographics on Twitter describing the number of operations carried out, including one dedicated to drone operations[1].

The Houthi Movement's drone program features two important advances that set it apart from other parties' drone programs: a concentration on coordinated operations and long-range strikes. The first of these improvements involves the routine use of drones in conjunction with other means of attack, most notably cruise missiles.

CAR reported regular operations in Saudi Arabia by Houthi forces in 2017, in which they crashed drones into radar systems directing surface-to-air Patriot missiles, enabling longer-range missions by other drones or cruise and ballistic missiles[2].

The Houthi Movement has also participated in operations in collaboration with other parties, either by coordinating on the launch of operations or by issuing contradicting statements about the origin of these attacks in order to thwart attribution of blame.

On various occasions, strikes have been launched utilizing a variety of attack methods, including ballistic missiles, cruise missiles, and drones. The Houthi forces themselves appear to move between these groups. According to CAR, early drone assaults in 2016 and 2017

[1] Yahya Sare'e, 'Tweet: Summary of Houthi Operations, 2021', 2 January 2022, accessible at: https://twitter.com/Yahya_Saree/status/1477745874499514369

[2] eremy Binniee, Houthis claim long-range cruise missile attack on UAE, **Janes**, 18 JANUARY 2022, accessible at: https://www.janes.com/defence-news/news-detail/houthis-claim-long-range-cruise-missile-attack-on-uae

were preprogrammed with GPS coordinates rather than remotely controlled, thereby transforming a drone into a sluggish cruise missile[1].

The Houthi drone program appears to have grown at a breakneck pace from its inception in late 2016 or early 2017 until the group began executing large attacks in 2019. Furthermore, unlike missiles, which are supplied from abroad, the Houthi group appears to have evolved from smuggled from abroad to being assembled in Yemen from foreign components and locally produced airframes.

Three operational features distinguish the Houthi drone program from that of other parties. First, the Houthi Movement's employment of drones prioritizes long-range penetration, with a priority on creating long-range weapons. Their use of preprogrammed GPS paths, which transforms drones into sluggish cruise missiles, enables the organization to fly beyond visible range, as does the development of newer drone types such as the Sammad-3. Their repeated attempts to hit sites such as Riyadh in Saudi Arabia and Abu Dhabi in the United Arab Emirates suggest an aim to demonstrate capabilities that directly duplicate Saudi Arabia's long-range air bombing campaign.

Second, Houthi troops prefer a high volume of operations, with drones being a regular part of their arsenal. Rather than using drones to exhibit technological capabilities or as propaganda exemplars, their emphasis on the volume of attacks demonstrates a concern with operational impact. Third, in order to attain these goals, Houthi forces have demonstrated a willingness to work with other groups in the region against common opponents, occasionally claiming

[1] Letter dated 21 February 2023 from the Panel of Experts on Yemen addressed to the President of the Security Council, **Security Council**, 21 February 2023, p. 155, accessible at: https://www.securitycouncilreport.org/atf/cf/%7B65BFCF9B-6D27-4E9C-8CD3-CF6E4FF96FF9%7D/S_2023_130.pdf

attacks presumably carried out by others (or possibly allowing others to claim attacks they themselves carried out).

Furthermore, particularly since 2019, the group has demonstrated a proclivity to use several means of attack in tandem, combining drones, cruise missiles, and ballistic missiles. As a result, the Houthi Movement employs drones for three primary purposes: reconnaissance, propaganda production (particularly through the display of drone prototypes), and pilot-to-target attacks[1].

Science October 7, 2023, The Houthis have promised to keep attacking ships in the Red Sea, one of the world's busiest maritime lanes, in order to put pressure on Israel to end its attacks on Gaza. Drone and rocket attacks on cargo ships in the Red Sea have prompted many of the world's largest shipping firms to declare their intention to avoid the region. The strikes began on October 7, following the start of the Israel-Hamas war.

The Houthis have reaffirmed their support for Hamas and threatened to attack any ship traveling to Israel. It is unclear whether all of the ships attacked were on their way there. They captured what they claimed was an Israeli cargo ship in November. They have since used drones and ballistic missiles to target multiple commercial boats.

As a result, the United States has organized an international naval operation to defend ships. Countries that have joined include the United Kingdom, Canada, France, Bahrain, Norway, and Spain. Mediterranean Shipping corporation, Maersk, Hapag-Lloyd, and the oil corporation BP have all stated that they are diverting vessels away from the Red Sea. Iran has

[1] Yannick Veilleux-Lepage and Emil Archambault, A Comparative Study of Non-State Violent Drone use in the Middle East, **Op.Cit**, p. 38.

been accused by the US of being "deeply involved" in the planning of operations against commercial ships in the Red Sea[1].

6.5. THE ISLAMIC STATE (IS)

The Islamic State (IS) has primarily deployed drones in the first category, such as DJI quadcopters. There are two forms of militant drone use: active-offensive and passive-defensive. Drones are used in active-offensive operations to carry out attacks. Drones can be used passively for surveillance, propaganda, and weapon transport.

IS adapted quadcopter drones to drop explosives on coalition soldiers on the ground between 2015 and 2017, carrying out 60-100 assaults each month. IS's employment of drones has recently moved from active-offensive to passive-defensive. This has become very common in Africa. The Islamic State West Africa Province (ISWAP) employed quadcopter drones to film segments of a propaganda video displaying its training camp in Nigeria in January 2022. ISWAP surveillance drones were observed over the position of Nigerian government forces in July 2022, just before the organization ambushed them[2].

In 2017, IS declared that it had an indigenous division dedicated to developing drones and a vast procurement network for drone parts. IS continues to be in possession of military-grade drones. From the group’s social media output, there have been at least 10 instances of IS

[1] Who are the Houthi rebels and why are they attacking Red Sea ships?, **BBC**, 23 December 2023, accessible at: https://www.bbc.com/news/world-middle-east-67614911

[2] Rueben Dass, Militants and Drones: A Trend That is Here to Stay, **The Royal United Services Institute**, 6 September 2022, accessible at: https://www.rusi.org/explore-our-research/publications/commentary/militants-and-drones-trend-here-stay

capturing military-grade drones from government forces over the past two years, particularly in Iraq[1].

The Islamic State of Iraq and the Levant's improvised attack drones were widely seen as a major threat capable of becoming as strategically significant as the "next improvised explosive device." Terrorist groups around the world have weaponized commercial drones for high-profile strikes, from Venezuela to Yemen, but ISIL's drone program stood out for its vast scope and impact on significant military operations. In 2017, ISIL carried out 60 to 100 drone assaults per month over Syria and northern Iraq. The organization used a mix of modified commercial drones, most of which were Chinese-made DJI Phantom quadcopters, and custom-built drones built in its own facilities. These homemade weapons were brutally effective, destroying at least 56 Iraqi military vehicles and killing or injuring over 100 Iraqi soldiers[2].

[1] **Ibid**.

[2] How The Army Out-Innovated The Islamic State's Drones, **War on the Rocks**, Dec. 21, 2020, accessible at: https://warontherocks.com/2020/12/how-the-army-out-innovated-the-islamic-states-drones/

CHAPTER 7: DEVELOPMENT USES OF DRONES IN THE WORLD

7. 1. INTRODUCTION

The development uses of drones are the hidden or unknown aspect when talking about this type of aircraft, given their increasing connection in media coverage around the world with military dimensions, armed conflicts, killings, assassinations, and field bombings, but the new Corona virus crisis that has struck the world since the end of the year 2019 Starting from China, he revealed many of the increasing uses by countries of the world of advanced preventive technology in strategies to combat the spread of the virus, which has become the main threat to human health security currently, in light of its rapid spread and transformation into a major pandemic that has claimed the lives of millions and ravaged the economies of countries of the world at all levels.

7.2. ROLES OF DRONES IN COMBATING CORONAVIRUS

Drones are at the forefront of the high-tech tools that have been increasingly employed around the world as part of the strategies adopted by many countries in their fierce war against the emerging Corona virus, whether at the level of detecting and monitoring infected cases, conducting the necessary tests, imposing strict quarantine, and educating the population. With the preventive measures followed, sterilization and disinfection campaigns, mapping the peak, reading warning statements, transporting food and medicines to remote areas, all the way to transporting postal parcels, and other vital tasks.

In this context, the most prominent roles played by drones in the strategies of countries around the world to combat the outbreak of the new Corona virus “Covid-19” can be reviewed as follows:

- **Monitoring and detecting people infected with Corona:** The Canadian drone company, Draganfly, in cooperation with the Australian Ministry of Defense and the University of South Australia, has actually developed new types of drones dedicated to combating the Corona virus, as these drones carry out a large number of tasks. Preventive measures include detecting people who may be suffering from Corona symptoms, such as coughing, sneezing, or high temperature, in crowds[1].
- **Accelerating coronavirus tests:** The US-based technology company "Zipline" revealed, on May 20, 2020, that Ghana is using delivery drones operated by the company, so that it can conduct new coronavirus tests faster for residents outside major cities. According to the company, the use of Delivery drones, to transport coronavirus test samples, enable governments to respond to the pandemic and help save lives faster, by shortening the time to deliver samples from the hours it takes for trucks to cross rural roads to collect them from hospitals, to less than an hour in some cases[2].
- **Monitoring quarantine violators:** Many countries around the world employ drones to monitor and track those with high temperatures who violate the quarantine rules imposed on them due to the Corona virus, as drones equipped with thermal cameras track those infected with the Corona virus and those who are under quarantine,

[1] 'Pandemic drones' could single people out in a crowd for coughing, sneezing, or running a temperature, developers say — here's how they work, **Insider**, Apr 11, 2020, accessible at: https://www.businessinsider.com/draganfly-pandemic-drone-will-detect-people-infected-with-coronavirus-2020-4

[2] Aryn Baker, Drones Are Delivering COVID-19 Tests in Ghana. Could the U.S. Be Next?, **Time**, April 22, 2020, accessible at: https://time.com/5824914/drones-coronavirus-tests-ghana-zipline/

whether self- or governmental. Those who violated the quarantine rules and their location is sent to the relevant police and medical authorities[1].

- **Precautionary sterilization and disinfection:** In many countries of the world, drones equipped with special means are used to spray disinfectant materials in the places intended to be cleansed and sterilized without human intervention, in order to avoid the possibility of transmission of infection, in addition to their great speed in completing such tasks. In this context, it was reported that The UAE Ministry of Interior said that the "Light Air Sports System" Committee has registered drones, through the unified registration platform, to allow their use in supporting the national sterilization program, as part of the measures to combat the new Corona virus, as the UAE is one of the first countries in using innovative means to assist in work. Sterilization of homes, buildings, and roads, including the use of robots and civil defense techniques, and enhancing personal protection[2].
- **Awareness of preventive measures:** According to the Chinese news agency "Xinhua," the authorities are using drones equipped with infrared thermal imaging lenses and loudspeakers, to detect people with fever at a certain distance, and to broadcast messages about preventive measures to the population, as they employ drones to patrol the area. Villages and urban roads to check any behavior that may contribute to the spread of the virus, such as people not wearing masks in public

[1] French watchdog condemns police for unlawful use of drones to patrol lockdown, **Reuters**, January 14, 2021, accessible at: https://www.reuters.com/article/health-coronavirus-france-drones/french-watchdog-condemns-police-for-unlawful-use-of-drones-to-patrol-lockdown-idINKBN29J19U/

[2] LIGHT AIR SPORTS COMMITTEE DISCUSSES LATEST DEVELOPMENTS VIA VIDEO CONFERENCE, **Ministry of Interior,** United Arab Emirates, April 25, 2020, accessible at: https://moi.gov.ae/en/media.center/news/042502.aspx

places, as “drones can attract people’s attention and are more effective than traditional methods of spreading such preventive warnings”[1].

- **Collecting and analyzing potential infection data:** Many countries have relied on drones to collect and analyze population data that reveal potential clusters and infection points during the new Corona virus outbreak around the world, as these drones can carry out monitoring missions around the clock that enable the competent authorities to draw maps. Accurate locations and times most vulnerable to the spread of the virus among the population, and then taking advantage of that data and analyzing it to determine the locations and times of curfews to effectively limit the spread of the virus.
- **Reading warning data:** Many countries around the world have resorted to using drones to read warning data to citizens. Drones carrying loudspeakers are used to read warning data to people in public places, without the need to rely on people to carry out such tasks. To reduce contact processes to the minimum possible on the one hand, and draw the attention of the population to greater response through this innovative technology on the other hand, in addition to making people aware of the seriousness of the authorities in imposing and monitoring precautionary measures to combat the epidemic on the third hand.
- **Monitoring remote places and roads:** Some countries have employed drone technology to establish effective monitoring points in remote places and roads that are difficult to reach due to geographical, security, or climatic considerations, as well as to detect unauthorized movements in the streets or illegal gatherings on rooftops, in

[1] 3 ways China is using drones to fight coronavirus, **World Economic Forum**, Mar 16, 2020, accessible at: https://www.weforum.org/agenda/2020/03/three-ways-china-is-using-drones-to-fight-coronavirus/

order to activate procedures And the closure and isolation measures imposed to limit the spread of the Corona epidemic among the population, as these aircraft monitor the extent of response to the closure measures in those dark spots in the country around the clock, and transfer the necessary data in this regard to the competent authorities to take whatever punitive or administrative measures they deem appropriate regarding violators of decisions. Lockdown and ban.

- **Transporting medicines, food and medical supplies:** The State of Rwanda used drones to transport food and medicines to rugged and remote places in the country as part of the measures taken to contain the Corona virus and accelerate the pace of food and treatment measures during the period of the spread of the pandemic[1]. At the beginning of 2020, the British Health Services Authority began experiments with using drones to deliver blood samples and life-saving chemotherapy as part of pioneering plans to save transportation time between hospitals and general surgery clinics[2].
- **Transporting postal parcels:** The Sultanate of Oman resorted to using drones to transport postal parcels in light of the Corona crisis. In April 2020, the logistics technology team at the Oman Logistics Center and Asyad Group conducted enriching experiments in the parcel delivery service and the warehouse inventory service using drones. The experience emphasizes the importance of using modern technology in postal logistical operations and adopting the latest programs and systems in data

[1] Rwandan medical workers deploy robots to minimise coronavirus risk, **Reuters**, May 30, 2020, accessible at: https://www.reuters.com/article/idUSL8N2DC04R/

[2] NHS using drones to deliver coronavirus kit between hospitals, The Guardian, Sat 17 Oct 2020, accessible at: https://www.theguardian.com/technology/2020/oct/17/nhs-drones-deliver-coronavirus-kit-between-hospitals-essex

exchange operations to enhance the efficiency of logistical operations, reduce costs, increase productivity and combat infection in the time of the pandemic[1].

7.3. DRONES TESTED TO STIMULATE RAINFALL

On March 17, 2021, the United Arab Emirates decided to test drones in rain seeding attempts, as these drones fly in the clouds and emit electrical pulses that support rainfall in a specific location in what is known as rain seeding. The UAE is already using drones to sprinkle salt between the clouds to support rainfall, as the leading Gulf country has allocated about $15 million to develop rain seeding technology in nine different methods with the aim of raising the annual rainfall rate.

Scientists at the British University of Reading are supervising one of these projects. Using this technology, scientists are trying to change the electronic balance in cloud particles to transform them into liquid drops of rain that the air cannot carry and thus rain falls. According to Professor Martin Ambaum, who supervises the project, “the rate of rain "It is declining significantly in the UAE, and this project aims to improve that." Ambaum explains that despite this, the country is witnessing large amounts of clouds, but it passes without rain. Here, this technology attempts to “persuade the vapor molecules to merge” and form water molecules, “just as a comb attracts static electricity when combing dry hair.” He added, “When the molecules merge, they become It is larger and therefore rain falls.”

According to Alia Al Mazrouei: Director of the Rain Enhancement Research Program in the United Arab Emirates, said, “These drones are supported by devices that release electrical charges and special sensors. They can fly at low altitude and emit electrical charges in air

[1] Coronavirus: Oman puts drones to test for parcel delivery, **The Arabian Stories**, April 6, 2020, accessible at: https://www.thearabianstories.com/2020/04/06/coronavirus-oman-puts-drones-to-test-for-parcel-delivery/

molecules, which supports rain fall," adding that "the results of the study will be evaluated to consider increasing funding." In the future"[1].

7.4. DRONES USES IN THE AGRICULTURAL DEVELOPMENT

According to the experience of the United Nations Food and Agriculture Organization (FAO), drones used in the field of agriculture can be equipped with photogrammetry equipment, with a camera that captures very detailed images, and aerial photographs from different angles, with great accuracy in detail, as the data collected from these drone flights facilitates the Governments can monitor areas, coastlines and forested areas, and plan interventions and infrastructure projects that benefit local farmers.

In this context, drone monitoring can help identify changes in forest cover, which can be easily observed in high-resolution aerial images, and can also be useful for monitoring forest and crop fires, land invasion and occupation, and allowing better management of natural resources, and farmers can make decisions. They are better about allocating resources and protecting their livelihoods if they have reliable information about new pests and diseases, for example, or in areas with damaged land where crops do not grow properly.

In an attempt to anticipate the negative effects of climate change, floods, and hurricanes on food security, the Philippine government, along with the Food and Agriculture Organization, launched a pilot project using drones to identify agricultural lands most at risk from natural disasters, and to identify ways in which these risks can be addressed. Safety methods include

[1] UAE to test cloud-busting drones to boost rainfall, **BBC**, 17 March 2021, accessible at: https://www.bbc.com/news/technology-56428984

contour farming, building retaining walls and planting protective plants, which can prevent successive disaster strikes[1].

Real-time information informs early warning systems, farm-level consultations and local and national plans and allows the government to develop immediate disaster risk reduction plans. Because drones can fly in coastal areas and forests, and they are also used for environmental monitoring. The uses of drones have advantages over traditional satellite imagery. Drones can be deployed even under cloud cover. Drones can provide quick information about pre- and post-disaster assessments, even in remote areas, in addition to accuracy of ground images of up to three centimetres. Because drones can cover up to 200 hectares in a single 30-minute flight, they can expedite the risk analysis process, which normally takes several days or weeks.

Drones monitor plants, in many countries from the United States to Australia, to combat pests and diseases. The remote sensors equipped with these drones can detect plant stress, which can be caused by a lack of water or fertilizer levels, as well as... Due to the attack of various agricultural pests, which drones can monitor by monitoring the decrease in photosynthetic activity in plants, which is not impossible for the naked human eye to distinguish in any case. The success of drones in proactively detecting the spread of agricultural pests would prevent significant crop losses and support the precautionary and preventive response strategies considered in this regard, as agricultural pests may spread from just one crop to all parts of the farm or may even expand to include neighboring farms as well. Then, drones enable farmers to focus on a specific area of extended agricultural land, and look from above to

[1] "Flying robots for food security Find out how drones can help meet today's food challenges", **The Food and Agriculture Organization (FAO)**, 10 Aug 2016, accessible at: https://www.fao.org/news/stories-archive/en/

provide assistance and support in effectively assessing the full scope of the field situation of those crops. Research is also currently being conducted to provide drones with robotic capabilities that enable them to carry out collection operations. Samples of insects or setting traps to catch them to save agricultural crops from their damage[1].

7.5. USING DRONES TO HELP DISPLACED PEOPLE IN AFRICA

Many relief and humanitarian organizations around the world, most notably the United Nations High Commissioner for Refugees, are using and employing many techniques and technological innovations within the framework of their strategy aimed at planning responses to relief operations, humanitarian support, rescue, and field follow-up. In this context, the use of these drones by relief organizations provides support. The necessary and effective assistance to cover its work in many sub-Saharan African countries, such as Niger, Mali, Uganda, Burkina Faso, and other countries that are witnessing successive waves of population displacement in increasingly large numbers, and then assess the needs of these displaced persons in an appropriate manner, in order to reach the best appropriate methods. To obtain the assistance they need, in addition to using these drones in assessing environmental damage resulting from the phenomenon of displacement and uncontrolled population movements[2].

According to Andrew Harper, head of the Innovation Unit of the United Nations High Commissioner for Refugees, the potential use of drones is increasing, in light of the many peaceful uses of this advanced technology, whether in the field of human rights monitoring,

[1] **Ibid**.

[2] "UNHCR uses drones to help displaced populations in Africa", The **UN Refugee Agency**, 21 November 2016, accessible at: https://www.unhcr.org/news/stories/unhcr-uses-drones-help-displaced-populations-africa

providing relief and support, or identifying camps and designated shelter areas. For the displaced, as this modern technology was greatly beneficial at a time when record numbers of people were displaced from their homes as a result of wars, persecution, and environmental disasters, including more than three million people leaving their homes as a result of conflicts in: South Sudan, Mali and Niger, which caused a wave of displacement across national borders in that fragile part of the world.

According to Benoit Moreno, External Relations Officer at the United Nations High Commissioner for Refugees, by using images taken by drones, the Commission is able to provide a new level of planning to enhance analyzes of the contexts surrounding crises of population displacement and asylum. These high-tech images have enabled Captured by drones, UNHCR and its international partners enable UNHCR and its international partners to understand, visualize and understand the real conditions on the ground in refugee camps and places where displaced people are sheltered, and then identify and meet the needs required to meet many humanitarian services for these displaced people, including water systems, toilets, education facilities, health care and other living matters. In addition, it also helped in the process of accurately registering and counting the displaced[1].

Finally; The previous pioneering development uses of drones in international and regional experiences reveal the good side of this advanced technology, which in the Middle East and North Africa region has become, to a large extent, only linked to military, security and intelligence work, while this military and security dimension, which is One of the endless uses of drones, all of which serve humanity, the well-being of human societies, and support

[1] **Ibid**.

the ambitions of countries to enhance stability, urbanization, sustainable development, explore horizons of knowledge, and develop human life.

REFERENCES

Paul Seabury, **Power, Freedom and Diplomacy: The Foreign Policy of the United State**, New York, Random House, Vintage, 1965.

James Rosenau, "Moral Ferver, Systemic Analysis, and Scientific Conciouness in Foreign Policy Research" in, Austin Ranny, (ed), **Political Science and Public Policy**, Chicago, Markham, 1968.

Christopher Hill, **The Changing Politics of Foreign Policy**, Palgrave Macmillan, 2002.

Col. KHALIFA HELAL KALIFA ALTENEIJI, **Middle East's drone race, and implication of weaponizations on the security landscape**, Brazilian Army Strategic Studies International, Rio de Janeiro, 2021.

Detlef Nolte, How to Compare Regional Powers: Analytical Concepts and Research Topics, **Review of International Studies**, (2010), 36.

Sandra Destradi, Regional powers and their strategies: empire, hegemony, and leadership, **GIGA German Institute of Global and Area Studies**, 2010.

Cline K., Rhamey P., Henshaw A., Sedziaka A., Aakriti T., Volgy T.J. Identifying Regional Powers and Their Status. **Major Powers and the Quest for Status in International Politics: Global and Regional Perspectives**. Ed. By Volgy T.J., Corbetta R., Grant K.A., Baird R.G. New York, Palgrave MacMillan Publ., 2011.

Stefan Wolff, Oya Dursun-Ozkanca, Regional and International Conflict Regulation: Diplomatic, Economic and Military Interventions, **Civil Wars**, Vol.14, No.3 (September 2012).

Kenneth N. Waltz, Man, the State and War (New York: Columbia University Press 1959).

The Regionalization of Conflict and Intervention, **An International Peace Academy Report**, New York, 2003.

Markus Wagner, Unmanned aerial vehicles, **Max Planck Encyclopedia of Public International Law**, Rüdiger Wolfrum, ed, Oxford University Press, Forthcoming, University of Miami Legal Studies Research Paper, 15-12, 2014.

Yannick Veilleux-Lepage and Emil Archambault, **A Comparative Study of Non-State Violent Drone use in the Middle East**, International Centre for Counter-Terrorism (ICCT), December 2022.

Ulrich Schneckener, "Fragile Statehood, Armed Non-State Actors and Security Governance", in: Alan Bryden, Marina Caparini, **Private Actors and Security Governance**, Geneva, Centre for the Democratic Control of Armed Forces DCAF, 2006.

Phil Williams, **Violent Non-State Actors and National and International Security**, International Relations, and Security Network (ISN), Zurich, 2008.

Katerina Dalacoura, "Islamist Movements as Non-state Actors and their Relevance to International Relations", in: Daphn Josselin and William Wallace (eds.), **Non-State Actors in World Politics**, New York, Palgrave, 2010.

George A. Theodorson, Achilles G. Theodorson, **A Modern Dictionary of Sociology**, New York ،Thomas Y. Crowell Com., 1969.

H. Popitz, **The Concept of Social Role as an Element of Sociological Theory**, Cambridge University Press, 1972.

Kal. J. Holsti, "National Role Conceptions in Study of Foreign Policy", **International Studies Quarterly**, 14, No.3, November 1970.

Naomi Wish, "Foreign Policy Makers and their National Role Conception, **International Studies Quarterly**, 24, December 1985.

[1] Aniseh Bassiri Tabrizi & Justin Bronk, **Armed Drones in the Middle East Proliferation and Norms in the Region**, Royal United Services Institute for Defence and Security Studies (RUSI), December 2018.

Majed Akhter, "The Proliferation of Peripheries: Militarized Drones and the Reconfiguration of Global Space", **Progress in Human Geography** (Vol. 2, No. 10, 2017).

Dave Sloggett, **Drone Warfare: The Development of Unmanned Aerial Conflict**, Pen and Sword Aviation, Barnsley, 2014.

Hyunsoo Yang, Yongseok Lee, Sang-Yun Jeon, Dongjun Lee, "Multi-rotor drone tutorial: systems, mechanics, control and state estimation", **Intelligent Service Robotics,** 2017, Vol. 10, Issue 2.

Luca Nevola & Ana Marco, Beyond Riyadh: Houthi Cross-Border Aerial Warfare 2015-2022, **The Armed Conflict Location & Event Data Project (ACLED)**, 17 January 2023, accessible at: https://acleddata.com/2023/01/17/beyond-riyadh-houthi-cross-border-aerial-warfare-2015-2022/

Michael Knights, Yemen's "Southern Hezbollah": Implications of Houthi Missile and Drone Improvements, **The Washington Institute**, Apr 1, 2021, accessible at: https://www.washingtoninstitute.org/policy-analysis/yemens-southern-hezbollah-implications-houthi-missile-and-drone-improvements

Twitter @abdusalamsalah, 9 June 2019, accessible at: https://twitter.com/abdusalamsalah/status/1137732703833468928

Yemen's Houthis propose to Saudi Arabia that both sides halt missile strikes, **Reuters**, SEPTEMBER 20, 2019, accessible at: https://www.reuters.com/article/us-yemen-saudi/yemens-houthis-say-will-cease-targeting-saudi-arabia-if-other-side-does-same-al-masirah-idUSKBN1W5261

Ibrahim Jalal, After Aramco: Will halting Houthi attacks on Saudi Arabia end Yemen's war?, **Middle East Institute**, October 1, 2019, accessible at: https://www.mei.edu/publications/after-aramco-will-halting-houthi-attacks-saudi-arabia-end-yemens-war

Houthi drones target airport, air base in Saudi Arabia, **Anadolu Agency**, march 3, 2021, accessible at: https://www.aa.com.tr/en/middle-east/houthi-drones-target-airport-air-base-in-saudi-arabia/2176138

Timeline: Houthis' drone and missile attacks on Saudi targets, **Aljazeera**, 14 Sep 2019, accessible at: https://www.aljazeera.com/news/2019/9/14/timeline-houthis-drone-and-missile-attacks-on-saudi-targets

For more details: Al Houthi Attacks on Saudi Arabia and the UAE, Critical Threats, January 19, 2022, accessible at: https://www.criticalthreats.org/analysis/january-2022-map-update-al-houthi-attacks-on-saudi-arabia-and-the-uae

Qasem Soleimani: US kills top Iranian general in Baghdad air strike, **BBC**, 3 January 2020, accessible at: https://www.bbc.com/news/world-middle-east-50979463

"A visual guide to the US airstrike that killed Qassem Suleimani", **The Guardian**, 3 Jan, 2020, accessible at: https://www.theguardian.com/world/2020/jan/03/visual-guide-airstrike-that-killed-qassam-suleimani-us-iran

Marcin Frąckiewicz, The Use of Drones in Iraq: Applications and Regulations, **TS2 Space**, 24 February 2023, accessible at: https://ts2.space/en/the-use-of-drones-in-iraq-applications-and-regulations/

Shaif Jeremy Binnie, "Attack on Saudi oil facilities deepens regional malaise", **Jane's Intelligence Review**, 09-Oct-2019.

INCESSANT WAR: TURKEY'S DRONE CAMPAIGN IN NORTH AND EAST SYRIA - 2022, The Rojava Information Center (RIC), MARCH 2023.

Mitch Prothero, Turkey used a new weapon in Syria that was so effective it looks like Russia won't dare confront Turkey directly, **Insider**, Mar 10, 2020, accessible at: https://www.insider.com/turkey-drones-syria-russia-wont-confront-directly-2020-3

Salim Çevik, Turkey's Military Operations in Syria and Iraq, **The Centre for Applied Turkey Studies (CATS), Stiftung Mercator and the German Federal Foreign Office**, May 2022.

Jonathan Regev, Alleged Israeli strikes in Syria destroy Hezbollah warehouse - report, **i24news**, November 13, 2022, accessible at: https://www.i24news.tv/en/news/middle-east/levant-turkey/1668355867-israeli-airstrikes-targeting-homs-syrian-media

Andrew Ghalili & Ari Cicurel, Israel Degrades Iranian Capabilities, Protects International Security, NatSec Brief, **The Jewish Institute for National Security of America (JINSA)**, February 1, 2023.

Ben Fishman, Conor Hiney, What Turned the Battle for Tripoli?, **The Washington Institute for near east policy**, May 6, 2020, accessible at: https://www.washingtoninstitute.org/policy-analysis/what-turned-battle-tripoli

Defence Secretary Ben Wallace gives a speech at the Air and Space Power Conference, **GOV.UK**, 15 July 2020, accessible at: https://www.gov.uk/government/speeches/defence-secretary-ben-wallace-gives-a-speech-at-the-air-and-space-power-conference

United Nations, "Special Representative Expresses Outrage over Actors Talking Peace while Fuelling Conflict in Libya, as Security Council Hears Calls for End to Foreign Meddling", 30 January 2020, accessible at: https://www.un.org/press/en/2020/sc14092.doc.htm

United Nations Security Council, Letter dated 29 November 2019 from the Panel of Experts on Libya established pursuant to resolution 1973 (2011) addressed to the President of the Security Council (S/2019/914), 2019, accessible at: https://digitallibrary.un.org/record/3838591

Jason Pack and Wolfgang Pusztai, Turning the Tide: How Turkey Won the War for Tripoli. **The Middle East Institute Policy Paper** (Washington DC: The Middle East Institute, 2020); Ioannis Sotirios Ioannou and Tziarras Zenonas. Turning the Tide in Libya: Rival Administrations in a New Round of Conflict. PRIO Cyprus Centre Policy Brief, 1 (Nicosia: **PRIO Cyprus Centre**, 2020).

Adam Rawnsley, "Meet China's Killer Drones", **Foreign Policy**, January 14, 2016, accessible at: https://foreignpolicy.com/2016/01/14/meet-chinas-killer-drones/

"UAV Export Controls and Regulatory Challenges, Working Group Report", **The Stimson Center**, 2015, accessible at: https://www.stimson.org/wp-content/files/file-attachments/ECRC%20Working%20Group%20Report.pdf

George Nacouzi, J.D. Williams, Brian Dolan, Anne Stickells, David Luckey, Colin Ludwig, Jia Xu, Yuliya Shokh, Daniel M. Gerstein, Michael H. Decker, **Assessment of the**

Proliferation of Certain Remotely Piloted Aircraft Systems: Response to Section 1276 of the National Defense Authorization Act for Fiscal Year 2017, RAND Corporation, 2018.

MIDDLE EAST AND AFRICA DRONE SERVICES MARKET SIZE & SHARE ANALYSIS - GROWTH TRENDS & FORECASTS (2023 - 2028), **Mordor Intelligence**, accessible at: https://www.mordorintelligence.com/industry-reports/middle-east-and-africa-drones-market

Middle East Military Drones Market Research Report: Forecast (2022-27), **MarkNtel Advisors**, Mar 2022, accessible at: https://www.marknteladvisors.com/research-library/middle-east-military-drones-market.html

"Global drone market estimated to reach $14 billion over next decade: study", **Reuters**, JULY 17, 2019, accessible at: https://www.reuters.com/article/us-usa-security-drones-idUSKCN1UC2MU

Middle East & Africa Drone Simulator Market Forecast to 2028, **Business Market Insights**, Oct 2021, accessible at: https://www.businessmarketinsights.com/reports/middle-east-and-africa-drone-simulator-market

"DoD warns China exporting killer autonomous drones to Middle East", **Flight Global**, 6 November 2019, accessible at: https://www.flightglobal.com/defence/dod-warns-china-exporting-killer-autonomous-drones-to-middle-east/135194.article

Report: China is driving use of armed drones in Middle East", **AP news**, December 17, 2018, accessible at: https://apnews.com/article/56cfdc2ab6224891a264fc88f70200c8

"Chinese Armed Drones Now Flying Across Mideast Battlefields", **Bloomberg**, October 3, 2018, accessible at: https://www.bloomberg.com/news/articles/2018-10-03/chinese-armed-drones-now-flying-across-mideast-battlefields

SETH J. FRANTZMAN, Israel records $12.5 billion in defense exports, led by drones, air defense, Breaking Defence, June 14, 2023, accessible at: https://breakingdefense.com/2023/06/israel-records-12-5-billion-in-defense-exports-led-by-drones-air-defense/

Israel's Drone Industry Reaches New Heights, Tackles Public Challenges, **Ministry of Economy and Industry, Israel**, March 2020, accessible at: https://itrade.gov.il/singapore/2020/03/16/israels-drone-industry-reaches-new-heights-tackles-public-challenges/

SETH J. FRANTZMAN, How Israel became a leader in drone technology, **The Jerusalem Post**, JULY 13, 2019, accessible at: https://www.jpost.com/israel-news/how-israel-became-a-leader-in-drone-technology-595209

Umar Farooq, The Second Drone Age: How Turkey Defied the US and Became a Killer Drone Power, The Intercept, May 14, 2019, accessible at: https://theintercept.com/2019/05/14/turkey-second-drone-age/

Turkey expands armed drone sales to Ethiopia and Morocco – sources, Turkey expands armed drone sales to Ethiopia and Morocco - sources, **Reuters**, October 14, 2021, accessible at: https://www.reuters.com/world/middle-east/turkey-expands-armed-drone-sales-ethiopia-morocco-sources-2021-10-14/

Delma Joseph and Preetish Kamat, The Implications Of Drone Proliferation In The Geopolitics Of The Middle East, **The Defence Horizon Journal**, March 20, 2023, accessible at: https://www.thedefencehorizon.org/post/uav-ucav-dones-proliferation-middle-east

Yusuf Alabarda, Türkiye's defense industry has come a long way, **Anadolu Agency**, May 10, 2023, accessible at: https://www.aa.com.tr/en/analysis/opinion-turkiyes-defense-industry-has-come-a-long-way/2893594

Baykar becomes top exporter in Turkey's defense, aerospace sector, **DAILY SABAH**, JUN 15, 2022, accessible at: https://www.dailysabah.com/business/defense/baykar-becomes-top-exporter-in-turkeys-defense-aerospace-sector

Michael Rubin, A Short History of the Iranian Drone Program, **American Enterprise Institute**, August 26, 2020, accessible at: https://www.aei.org/research-products/report/a-short-history-of-the-iranian-drone-program/

SNEHESH ALEX PHILIP, Why Iran's drone programme is a 'triumph' – Harsh sanctions, western components & simple designs, The Print, 23 January, 2023, accessible at: https://theprint.in/defence/why-irans-drone-programme-is-a-triumph-harsh-sanctions-western-components-simple-designs/1326076/

Seth J. Frantzman, Iran's export of drones to Russia will lead to more proliferation and threaten US partners, Atlantic Council, November 18, 2022, accessible at: https://www.atlanticcouncil.org/blogs/iransource/irans-export-of-drones-to-russia-will-lead-to-more-proliferation-and-threaten-us-partners/

Garrett Nada, Explainer: Iran's Drone Exports Worldwide, **The Iran Primer, United States Institute for Peace**, June 12, 2023, accessible at: https://iranprimer.usip.org/blog/2022/nov/16/explainer-iran%E2%80%99s-drone-exports-worldwide

Mohammed Soliman, Drones are re-engineering the geopolitics of the Middle East, **The Middle East Institute**, March 7, 2022, accessible at: https://www.mei.edu/publications/drones-are-re-engineering-geopolitics-middle-east

UAE's first locally-made drone unveiled at Umex, The National News, Feb 24, 2020, accessible at: https://www.thenationalnews.com/uae/government/uae-s-first-locally-made-drone-unveiled-at-umex-1.983259

UAV, **Edge**, accessible at: https://edgegroup.ae/solutions?brand=adasi&category=uav

Global arms industry: Sales by the top 25 companies up 8.5 per cent; Big players active in Global South, **the Stockholm International Peace Research Institute (SIPRI)**, 7 December 2020, accessible at: https://www.sipri.org/media/press-release/2020/global-arms-industry-sales-top-25-companies-85-cent-big-players-active-global-south

Saudi Arabia in pact with Turkey's Baykar Tech to localise drone manufacturing, Reuters, August 7, 2023, accessible at: https://www.reuters.com/world/middle-east/saudi-arabia-pact-with-turkeys-baykar-tech-localise-drone-manufacturing-2023-08-06/

Saudi-Turkey Pact Targets Localization of Drone Manufacturing, **The Media Line**, , August 8, 2023, accessible at: https://themedialine.org/headlines/saudi-turkey-pact-targets-localization-of-drone-manufacturing/

First stage of Saudi drone factory complete: KACST, **Arab News**, 17 June 2017, accessible at: https://www.arabnews.com/node/1116351/amp

Chinese and Saudi firms create joint venture to make military drones in the kingdom, **Defense News**, Mar 9, 2022, accessible at: https://www.defensenews.com/unmanned/2022/03/09/chinese-and-saudi-firms-create-joint-venture-to-make-military-drones-in-the-kingdom/

Stijn Mitzer and Joost Oliemans, The Middle East's Game of Drones: Egypt's UAV Arsenal, **Oryx**, December 28, 2021, accessible at: https://www.oryxspioenkop.com/2021/12/the-middle-easts-game-of-drones-egypts.html

Factbox: What are the 1st Egyptian-made drones able to do?, **Ahram Online**, 5 Dec 2021, accessible at: https://english.ahram.org.eg/NewsContent/1/1237/443842/Egypt/Defence/Factbox-What-are-the-st-Egyptianmade-drones-able-t.aspx

Stijn Mitzer and Joost Oliemans, Algiers Calling: Assessing Algeria's Drone Fleet, **Oryx,** December 02, 2021, accessible at: https://www.oryxspioenkop.com/2021/12/algiers-calling-assessing-algerias.html

Chinese CH-4B Drones Keep Crashing In Algeria For Technical Fault, Global Defense Corp, March 11, 2021, accessible at: https://www.globaldefensecorp.com/2021/03/11/chinese-ch-4b-drones-keep-crashing-in-algeria-for-technical-fault/

Adcom adds to Algerian force, Times Aerospace, accessible at: https://www.timesaerospace.aero/features/defence/adcom-adds-to-algerian-force

Algerian Army Seeks China's Expertise in Drone Manufacturing, Asharq Al Awsat, 15 November 2023, accessible at: https://english.aawsat.com/arab-world/4669446-algerian-army-seeks-china%E2%80%99s-expertise-drone-manufacturing

With the help of Israel, Morocco is the first African country to enter the drone manufacturers club, **Middle East Monitor**, October 15, 2022, accessible at: https://www.middleeastmonitor.com/20221015-with-the-help-of-israel-morocco-is-the-first-african-country-to-enter-the-drone-manufacturers-club/

Enrique Fernández, Morocco will be the first African country to manufacture drones, **Atalayar**, Jun 6, 2023, accessible at: https://www.atalayar.com/en/articulo/politics/morocco-will-be-first-african-country-manufacture-drones/20221014123446158639.html

Tal Beeri, 'Iran's "UAV Army" – A Global Threat', **ALMA Research and Education Center**, December 2021, accessible at: https://israel-alma.org/wp-content/uploads/2021/12/Irans-UAV-Army-–-A-Global-Threat.pdf

Milton Hoenig, Hezbollah and the Use of Drones as a Weapon of Terrorism, Public Interest Report, Spring 2014 – Volume 67 Number 2, accessible at: https://uploads.fas.org/2014/06/Hezbollah-Drones-Spring-2014.pdf

DANIEL L. BYMAN, HEZBOLLAH'S DILEMMAS, **FOREIGN POLICY AT BROOKINGS**, POLICY BRIEF, NOVEMBER 2022, accessible at: https://www.brookings.edu/wp-content/uploads/2022/11/FP_20221110_hezbollah_dilemmas_byman.pdf

Mahmut Chengiz, Perspective – Drone Proliferation in the Conflict Zones: Who are the Suppliers and Users?, **Small War Journal**, 28 Oct, 2023, accessible at: https://smallwarsjournal.com/blog/perspective-drone-proliferation-conflict-zones-who-are-suppliers-and-users

Massaab Al-Aloosy, 'Deterrence by Insurgents: Hezbollah's Military Doctrine and Capability Vis-à-Vis Israel', Small Wars & Insurgencies 33, no. 6 (August 2022): 999–1016, accessible at: https://doi.org/10.1080/09592318.2022.2057750

Anna Ahronheim, Hezbollah has some 2,000 unmanned aerial vehicles, **Jerusalem Post**, December 22, 2021, accessible at: https://www.jpost.com/middle-east/article-689470

Kerry Chávez, Ori Swed, How Hamas innovated with drones to operate like an army, **Bulletin of the Atomic Scientists**, November 1, 2023, accessible at: https://thebulletin.org/2023/11/how-hamas-innovated-with-drones-to-operate-like-an-army/

Arison Neo, What do we know about Hamas' drones?, **Israel Hayom**, May 26, 2021, accessible at: https://www.israelhayom.com/2021/05/26/what-do-we-know-about-hamas-drones/

Dmytro Kaniewski, Hamas: Learning about drone warfare from the war in Ukraine, **DW**, Oct. 10, 2023, accessible at: https://www.dw.com/en/hamas-learning-about-drone-warfare-from-the-war-in-ukraine/a-67169578

Yahya Sare'e, 'Tweet: Summary of Houthi Operations, 2021', 2 January 2022, accessible at: https://twitter.com/Yahya_Saree/status/1477745874499514369

Jeremy Binniee, Houthis claim long-range cruise missile attack on UAE, **Janes**, 18 JANUARY 2022, accessible at: https://www.janes.com/defence-news/news-detail/houthis-claim-long-range-cruise-missile-attack-on-uae

Letter dated 21 February 2023 from the Panel of Experts on Yemen addressed to the President of the Security Council, **Security Council**, 21 February 2023, p. 155, accessible at: https://www.securitycouncilreport.org/atf/cf/%7B65BFCF9B-6D27-4E9C-8CD3-CF6E4FF96FF9%7D/S_2023_130.pdf

Who are the Houthi rebels and why are they attacking Red Sea ships?, **BBC**, 23 December 2023, accessible at: https://www.bbc.com/news/world-middle-east-67614911

Rueben Dass, Militants and Drones: A Trend That is Here to Stay, **The Royal United Services Institute**, 6 September 2022, accessible at: https://www.rusi.org/explore-our-research/publications/commentary/militants-and-drones-trend-here-stay

How The Army Out-Innovated The Islamic State's Drones, **War on the Rocks**, Dec. 21, 2020, accessible at: https://warontherocks.com/2020/12/how-the-army-out-innovated-the-islamic-states-drones/

'Pandemic drones' could single people out in a crowd for coughing, sneezing, or running a temperature, developers say — here's how they work, **Insider**, Apr 11, 2020, accessible at: https://www.businessinsider.com/draganfly-pandemic-drone-will-detect-people-infected-with-coronavirus-2020-4

Aryn Baker, Drones Are Delivering COVID-19 Tests in Ghana. Could the U.S. Be Next?, **Time**, April 22, 2020, accessible at: https://time.com/5824914/drones-coronavirus-tests-ghana-zipline/

French watchdog condemns police for unlawful use of drones to patrol lockdown, **Reuters**, January 14, 2021, accessible at: https://www.reuters.com/article/health-coronavirus-france-drones/french-watchdog-condemns-police-for-unlawful-use-of-drones-to-patrol-lockdown-idINKBN29J19U/

LIGHT AIR SPORTS COMMITTEE DISCUSSES LATEST DEVELOPMENTS VIA VIDEO CONFERENCE, **Ministry of Interior,** United Arab Emirates, April 25, 2020, accessible at: https://moi.gov.ae/en/media.center/news/042502.aspx

3 ways China is using drones to fight coronavirus, **World Economic Forum**, Mar 16, 2020, accessible at: https://www.weforum.org/agenda/2020/03/three-ways-china-is-using-drones-to-fight-coronavirus/

Rwandan medical workers deploy robots to minimise coronavirus risk, **Reuters**, May 30, 2020, accessible at: https://www.reuters.com/article/idUSL8N2DC04R/

NHS using drones to deliver coronavirus kit between hospitals, The Guardian, Sat 17 Oct 2020, accessible at: https://www.theguardian.com/technology/2020/oct/17/nhs-drones-deliver-coronavirus-kit-between-hospitals-essex

Coronavirus: Oman puts drones to test for parcel delivery, **The Arabian Stories**, April 6, 2020, accessible at: https://www.thearabianstories.com/2020/04/06/coronavirus-oman-puts-drones-to-test-for-parcel-delivery/

UAE to test cloud-busting drones to boost rainfall, **BBC**, 17 March 2021, accessible at: https://www.bbc.com/news/technology-56428984

"Flying robots for food security Find out how drones can help meet today's food challenges", **The Food and Agriculture Organization (FAO)**, 10 Aug 2016, accessible at: https://www.fao.org/news/stories-archive/en/

"UNHCR uses drones to help displaced populations in Africa", The **UN Refugee Agency**, 21 November 2016, accessible at: https://www.unhcr.org/news/stories/unhcr-uses-drones-help-displaced-populations-africa

Léo PÉRIA-PEIGNÉ, TB2 Bayraktar Big Strategy for a Little Drone, **Security Studies Center**, April 17, 2023, accessible at: https://www.ifri.org/sites/default/files/atoms/files/peria-peigne_tb2_bayraktar_2023.pdf