KYIV-MOHYLA
LAW & POLITICS JOURNAL
KYIV-MOHYLA SCHOLARLY PEER-REVIEWED JOURNALS

DOI: 10.18523/2414-9942.11.2025.155-164

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UNMANNED AERIAL VEHICLES DURING FIRST WORLD WAR AND INTERWAR PERIOD (1914-1939): MILITARY EXPERIMENTS, ORIGINS OF INTERNATIONAL LEGAL REGULATION

Abstract

An analysis of emergence and development of unmanned aerial vehicles (UAVs), or drones, during the First World War and in the interwar period (1914-1939) has been made. The authors have examined the first military experiments in the United States, Great Britain, France and the USSR that laid the grounds for the future use of UAVs in military. Particular attention has been paid to such prototypes as the American Kettering Bug and the British Aerial Target, and the first production models, in particular the OQ-2 Radioplane. The beginning of international legal regulation of the use of military aviation (the Paris Convention, the Hague Rules of Air Warfare), which also became the basis for the future regulation of the use of UAVs, has been also studied. It has been emphasized that despite technological limitations this period was key to the formation of engineering concepts and legal approaches that influenced the further development of drones.

Key Words: Unmanned aerial vehicle, UAV, Drone, First World War, Military experiment, International law, Military aviation

Introduction

The First World War was a turning point in the history of military equipment, particularly in the development of aviation. Along with the appearance of manned aircraft over the battlefield, an idea emerged of drones that could perform similar tasks without risk to humans. Although the technological limitations of the early XX century did not allow for fully autonomous systems, numerous military experiments in the United States, Great Britain, France and other countries laid the basics for future developments in unmanned aircraft.

In the interwar period (1919-1939) interest in unmanned technologies only grew. This was due to both the war experience and the development of radio control and automatic guidance systems. It was then that the first remotely piloted aircraft were tested,

being initially seen primarily as targets for anti-aircraft gunners and pilots, but later acquired other qualities as the design evolved.

Simultaneously with technological development the process of international legal regulation of the use of aviation (including drones) began. The agreements concluded after the First World War were supposed to regulate air operations and prohibit certain types of weapons, but there were no clear rules for UAVs.

This article explores attempts to create UAVs, their technical features and military use in 1914-1939 and analyzes the emergence of international legal norms that could have influenced the further development of unmanned technologies.

Literature review and methodological approaches

The development of drones during the First World War and the interwar period (1914-1939) was characterized by a series of experiments that laid the foundation for the future use of UAVs (primarily in military affairs).

The authors of the methodological recommendations "Peculiarities of the use of unmanned aerial vehicles by police authorities and units"[1] presented their own vision of the history of the creation and development of unmanned aviation

Also noteworthy is a proposal of periodization of UAVs' use by the nature of the tasks assigned to them – from reconnaissance (at the first stage) to combat support tasks and strikes on ground targets at the second and third stages made by A. Feshchenko[2].

S. Casey-Maslen, M. Homayounnejad, H. Stauffer and N. Weizmann reviewed the development of UAVs and their legal status[3]. Among the first effective attempts to create drones, they mention the Kettering Bug, an experimental development of 1918 that could have become the first "bomb drone" (a gyroscopically controlled biplane capable of carrying explosives and remotely guided to the target). In addition, an analysis of international legal aspects of arms development has been made, which makes it possible to trace the first attempts to control new types of military equipment. For example, the Briand-Kellogg Pact of 1928 has been mentioned, which formally prohibited war as a mean of solving international conflicts. This is an important moment for understanding how the international community was beginning to comprehend the need to regulate the latest weapons, although no specific agreements on UAVs existed at the time. At the same time, it should be emphasized that the authors focus on the events of the second half of the XX century and the impact of the first experiments on the development of drones is somewhat superficial. There is also a lack of analysis of the experience of other countries in this area (for example, the Great Britain and France). Similarly, the legal aspect is presented mainly from the perspective of the present which is certainly interesting for understanding the current regulation of UAVs, but does not provide a complete picture of the formation of the first rules and restrictions for such technologies.

The work of M. Hasian covers a wide range of issues related to the use of drones in warfare (primarily political and moral and ethical aspects, as well as legal regulation of their use)[4]. The author made in-depth analysis of the evolution of military technology and strategy, providing a history of experiments with automated control systems in military aviation and referring to the role of the latter in the colonial policy of Great Britain in the interwar period.

D. Hambling studies the development of UAVs in detail, starting with the very first

[1] Sakovskyi, A., Naumenko, S., Kravchenko, S., Yefimenko, I., et al. *Peculiarities of the Use of Unmanned Aerial Vehicles by Police Bodies and Units : Methodological Recommendations*. Kyiv : National Academy of Internal Affairs, 2022. 72 p.

[2] Feshchenko, A. *The Use of Unmanned Aerial Vehicles in Military Conflicts of the Late 20th – Early 21st Century: Dissertation for the Degree of Candidate of Historical Sciences: [Specialty 20.02.22 "Military History"]*. Kyiv : National Defense University of Ukraine, 2011. P. 7

[3] Casey-Maslen, S., Homayounnejad, M., Stauffer, H., Weizmann, N. *Drones and Other Unmanned Weapons Systems under International Law*. Boston; Leiden: Brill, 2018. 268 p.

[4] Hasian, M. *Drone Warfare and Lawfare in a Post-Heroic Age*. Tuscaloosa: The University of Alabama Press, 2016. 280 p.

experiments[5]. For example, during the First World War the British worked on the Aerial Target project, hoping to create the first radio-controlled aircraft, but due to technical difficulties this was never realized. The Americans, in turn, developed the Kettering Bug, an early version of a cruise missile). This demonstrates that the drone concept had prospects even then, but due to low reliability the experiments were delayed and the war ended before they could be used. The interwar period was a time of stagnation for UAVs as the military viewed them mostly as guided targets. For example, in the 1930s, the British tested the Fairey Queen and although it proved to be quite effective, it was used only for exercises. The military command remained skeptical about the actual combat use of this model. Overall, the author successfully demonstrates the difficulties faced by the first drone developers and allows us to understand why they were not taken seriously for a long time. He also briefly mentions that the issue of legal regulation of the use of military aviation was already raised: there were discussions about whether it complied with international law but the fighting quickly (and drastically) changed these ideas.

The research of L. Pazmiño is a valuable source for researching the development of UAVs in the military sphere, covering both technical experiments and international legal initiatives to regulate their use[6]. One of its key strengths is the detailed overview of early drone experiments. The author highlights the first documented case of their combat use – the launch of 200 explosive-laden balloons by the Austrians during the siege of Venice in 1848. This experiment showed not only the prospects of the UAV, but also the difficulties associated with its controllability, as wind changes forced some of the balloons to return. Later, during the First World War, Germans developed the Torpedo Gleiter – an early version of a guided air weapon launched from airships and controlled through a thin wire. In the United States of America, in 1917, Elmer Sperry and Peter Hewitt created the Automatic Aeroplane – the first American UAV that became a prototype for future cruise missiles. Details of the development of international legal regulation in the field of aviation are also extensively covered. As the Paris Convention of 1919 established the principle of air sovereignty of states, its additional Protocol of 1929 prohibited the crossing of the airspace of another state by an "unmanned aircraft" without special permission. Author states that this is the first international legal act in the field of UAVs[7].

A study by M. Schulzke examines moral, legal and political aspects of the use of drones in modern conflicts[8]. The author analyzes how UAVs affect the way warfare is conducted and considers their relevance to the theory of just war, beginning from outlining the key issues related to the use of drones, explaining their role in transforming modern warfare and then going to explore the history of UAVs development and their gradual introduction into military operations. Special attention is paid to the ethical dilemmas arising from remote warfare. The author analyzes the arguments both in favor of and against the use of drones, in particular with regard to the issue of responsibility for strikes. He also considers whether the use of UAVs meets the criteria for a just war, such as proportionality, legality and necessity of the use of force.

As of the problem of compliance with international humanitarian law, it is considered in the context of the ability of drones to distinguish between combatants and civilians, and the level of proportionality of the use of force is assessed. A significant part of the book is devoted to the prospects of creating autonomous combat systems and the risks associated with the lack of human control over them. Meanwhile the political aspects of the use of UAVs are examined in terms of mechanisms that can limit their use

[5] Hambling, D. *Swarm Troopers: How Small Drones Will Conquer the World*. South London: Popular Science, 2015. 340 p.

[6] Pazmiño, L. *The International Civil Operations of Unmanned Aircraft Systems under Air Law (Aerospace Law and Policy)*. Springer, 2020. 217 p.

[7] Pazmiño, L. *The International Civil Operations of Unmanned Aircraft Systems under Air Law (Aerospace Law and Policy)*. Springer, 2020. P. 21.

[8] Schulzke, M. *The Morality of Drone Warfare and the Politics of Regulation*. New Security Challenges. Palgrave Macmillan, 2017. DOI: https://doi.org/10.1057/978-1-137-53380-7.

in wars. The author also researches possible ways to reduce the damage caused by the use of drones and to raise the standards of their use in military conflicts. The book concludes with a summary of the main conclusions regarding the ethical and legal issues of drone use and suggests possible directions for further research and regulation of this technology, which makes it a valuable resource for researchers of international law, military ethics and security policy, helping to understand both the potential benefits of drones in reducing military casualties and the risks associated with their uncontrolled use.

Monograph by M. Karau[9] is a thorough research of the activity of German Navy in Flanders waters during the First World War. The author pays considerable attention to naval operations, the role of submarines, and strategic decisions of the command. For the analysis of the development of unmanned aerial vehicles and the international legal regulation of their use in 1914-1939 the book provides a general context for understanding the military experiments of that time. It also contains a detailed description of the air component of naval operations, including the use of aircraft for reconnaissance, coastal patrols, in defence of the ports of Ostend, Zeebrugge and Brugges, as well as to fight British submarines and naval forces. Importantly, the study examines the impact of British aviation, which in 1918 began actively patrolling the English Channel, leading to the increase of losses of German submarines. This is important for understanding early military experiments with the use of aviation in naval operations and although UAVs in the classical sense have not yet been used, the provided picture of the use of aviation in naval warfare allows tracing the origins of future unmanned technologies.

J. Perry focused on the history of drones' development and testing in the U.S. Navy, starting with the First World War[10]. He suggests that the U.S. Navy was probably right to refuse to invest heavily in UAVs research (particularly carrier drones) until the beginning of the last decade of the twentieth century, given their technological imperfections, low performance and questionable operational need (compared to manned aircraft).

M. Hirschberg substantiates the view that UAVs in the World War I and until the very beginning of World War II were developed primarily to destroy enemy ships, fortifications and other well-protected important targets. Thus, drones were actually cruise missiles as their design level did not yet allow them to direct the warhead to the target and return the delivery system to the base. As a result, technological advances have made the use of UAVs to hit such targets more efficient and affordable than manned aircraft[11].

This topic was previously studied also by the authors of this paper – M. Akimov[12] and I. Pokhylenko[13] – however, given the constant development of drones and the significant impact of the ongoing Russian-Ukrainian war on this process, there is a need for further analysis of key stages of development, assessment of the latest trends and forecasting of future directions of the use of UAVs.

[9] Karau, M. *Wielding the Dagger: The MarineKorps Flandern and the German War Effort, 1914-1918.* Contributions in Military Studies. Praeger, 2003. 280 p.

[10] Perry, J. *Navy Unmanned Air Systems, 1915–2011*. AIAA Centennial of Naval Aviation Forum "100 Years of Achievement and Progress", 2011.

[11] Hirschberg, M. *American Attack Unmanned Aerial Vehicles (UAVs): A Century of Progress*. SAE Technical Paper 2003-01-3064, 2003. DOI: https://doi.org/10.4271/2003-01-3064.

[12] Akimov, M. Combat Use of Lighter-Than-Air Aircraft: The Beginning of International Legal Regulation. *Educational and Scientific Support for the Activities of Security and Defense Sector Components of Ukraine: Proceedings of the International Scientific and Practical Conference, Khmelnytskyi, November 22, 2019*. Khmelnytskyi: NADPSU, 2019. Pp. 177–179; M. O. Akimov, The Role of the League of Nations in the International Legal Regulation of Aerial Warfare. In *Modern Warfare: Humanitarian Aspect. Abstracts of the Scientific and Practical Conference of the Ivan Kozhedub Kharkiv National Air Force University, May 31 – June 1, 2018*, Kharkiv : Ivan Kozhedub Kharkiv National Air Force University, 2018. Pp. 74–78.

[13] Pokhylenko, I. The Role and Significance of Unmanned Aerial Vehicles in Aviation Activities. *Almanac of Law. Legal Principles of Lawmaking: National and Foreign Experience: On the Occasion of the 75th Anniversary of the V. M. Koretsky Institute of State and Law of the National Academy of Sciences of Ukraine, 1949–2024*. Vol. 15. Kyiv : V. M. Koretsky Institute of State and Law of the NAS of Ukraine, 2024. P. 399–404.

Research methodology

The methodology for studying the development of UAVs during the First World War and the interwar period is based on an interdisciplinary approach. The main methods include:

Historical and chronological analysis – for study of the main events and technological achievements in the development of unmanned aircraft.

Comparative analysis – for comparing the development of unmanned aviation in different countries, including the United States of America, the Great Britain, France and the USSR.

Legal analysis – for studying international agreements and treaties that could affect the regulation of unmanned aerial vehicles.

Technical analysis – for evaluation of engineering solutions used in unmanned systems of that period.

The period of the First World War and the interwar years (1914-1939): military experiments and developments

This period in question was a key stage in the development of drones. It was then that the first real successes in the development of UAVs (including radio-controlled aircraft) and air projectiles took place. Wars and technological advances always gave impetus to the active improvement of unmanned systems, but the First World War brought mechanization and automation in military affairs to unprecedented heights (and along with it, the causing of human losses to an industrial level). It was then that military commanders began to seriously consider the use of drones for reconnaissance, bombing, and training purposes.

One of the ambitious projects was the development of an army of unmanned aircraft, which was announced in 1918 by French Prime Minister Georges Clemenceau. Although this project was not completed after the end of hostilities, it demonstrated interest in technologies that would reduce human losses during hostilities.

The signing of the Armistice in Compiegne and later the Treaty of Versailles did not put an end to the development of drones. The world's leading aviation powers continued to experiment with remote control and automatic systems. In 1923, the French engineer Maurice Percheron developed and tested the first military drone, the design of which provided for the possibility of autonomous flight with a number of specific tasks. In 1935, British-born engineer Reginald Lee Dugmore developed the first remotely piloted target aircraft, the OQ-2 Radioplane, and offered it to the U.S. Army. This UAV became the first mass-produced model to be used for training of the anti-aircraft gunners during the Second World War.

At the same time, the experiments with automated versions of the DH.82 Queen Bee aircraft took place in the Great Britain. It was from this aircraft that the nickname "drone" originated due to the characteristic sound of the engine, which resembled the humming of a drone; the term became so common that the U.S. Army has officially used it as a common name for UAVs since 1941.

The Soviet Union was no exception. Despite being delayed by the devastation and chaos of the Civil war and 1920s, the Soviet aviation industry was rapidly making up for lost time. Already in the early 1930s, the Special Technical Bureau (Ostekhburo) under the People's Commissariat for Military and Naval Affairs received an order to develop a remote control system for aircraft. The initiative belonged to Marshal Mikhail Tukhachevsky, who sought to find a way to use outdated and worn-out machines that were not suitable for combat but could still take off. They were supposed to be used as remote-controlled bombers to attack targets with powerful air defense systems (as guided "flying bombs") and as targets for anti-aircraft training. Initially, the twin-engine TB-1 bomber was the main candidate for conversion into a drone. Despite being the world's first mass-produced all-metal monoplane bomber, it quickly became obsolete, giving way to the four-engine TB-3, but it had a fairly large bomb load and

acceptable survivability. The Daedalus control system operated on the principle of tone modulation, transmitting a total of 16 commands (turns, altitude and speed control, bomb drops, etc.) over a distance of 25 km using acoustic tones. The receiver on board the UAV recognized the signals coming through the filter system and activated the appropriate mechanisms. A unique detail was the automatic landing system, which allowed the drone to descend and land independently after activating the appropriate command. Since 1937 the concept of a "flying bomb" was tried. The remotely controlled TB-3 received a 6.2-ton warhead filled with TNT, hexogen and aluminum powder. The control system ensured high accuracy of target destruction. However, due to technical problems, delays in finalization and changes in military priorities, the project was curtailed in 1938. Nevertheless, Soviet developments in the field of drones became a valuable basis for future developments in the field of guided weapons.

Germany was actively working on the development of remote control systems that would form the basis of future unmanned aerial vehicles and guided missiles. Despite technological limitations, a number of experiments were carried out at that time that formed the basis for the development of automated combat systems in the twentieth century.

The first large-scale UAV project in Germany was the development of a torpedo airframe, the concept of which was proposed in 1914 by Wilhelm von Siemens[14]. It was planned that the glider would carry a naval torpedo, which, after reaching a predetermined altitude, would separate and continue to move in the water to the target. It was controlled by a 4 km long copper wire that transmitted commands from the operator. Tests began in 1915 and the final test took place on August 2, 1918, when the glider was dropped from a Zeppelin LZ 80 (L 35) airship. The device lost control after a wire broke, which showed the shortcomings of the technology. Further research stopped after the signing of the Armistice in Compiegne.

In addition to aviation unmanned systems, Germany conducted experiments with remote control of surface vehicles. FL boat (*Fernlenkboot*)[15] was designed for the German Navy; 17 meters long, it carried 700 kg of explosives and was intended for attacks on enemy ships. It was controlled by radio, but the accuracy of targeting remained low, which limited the effectiveness of this weapon.

After the end of World War I the Treaty of Versailles imposed severe restrictions on the development of German military aviation. As a result, research on unmanned systems continued under the guise of civilian aviation developments. But 1937, only two years after the official announcement of existence of German military aviation (Luftwaffe), the Reich Ministry of Aviation (RLM) contracted Fieseler to develop the Fi 157, a remotely piloted target drone for training anti-aircraft troops. The aircraft had an all-wood construction and was launched from under a bomber carrier. During testing, all three prototypes crashed. Its manned version (Fi 158) was created and used for research on remote control systems. However, low efficiency and technological problems led to the termination of development.

By 1939, Germany had made significant progress in the development of unmanned combat vehicles. The most famous result of this research was the Fau-1 (V-1, Vergeltungswaffe-1), the world's first mass-produced projectile aircraft, which was put into production in 1942 and was actively used during World War II. The next step was the creation of the Fau-2 (V-2, Aggregat-4), the world's first ballistic missile. It was developed under the leadership of Wernher von Braun and was used by Germany at the end of the war to strike the United Kingdom

[14] Branfill-Cook, R. *Torpedo: The Complete History of the World's Most Revolutionary Naval Weapon.* Seaforth Publishing, 2014. P. 133.

[15] Karau, M. *Wielding the Dagger: The MarineKorps Flandern and the German War Effort, 1914-1918 (Contributions in Military Studies)*. Praeger; First Edition. October 30, 2003. P. 91.

and Belgium. The Fau-2 was the first rocket to reach outer space and laid the foundation for further development of missile technology in the United States, the Soviet Union and other countries.

Consequently, the period of the First World War and the interwar years was crucial in the development of UAVs. Military conflicts stimulated the development of technologies that could reduce human losses and increase the efficiency of combat operations. It was at this time that the first successful experiments with remote control of aircraft and automated systems were carried out. Leading powers in the field of aviation were actively researching and testing various drone concepts – from target aircraft to guided projectiles.

Although many designs at the time did not reach widespread use due to technical difficulties, they laid the groundwork for future advances in unmanned systems. The experience of these developments later contributed to the creation of modern drones and guided missile weapons that have dramatically changed the conduct of hostilities in the twentieth and twenty-first centuries.

Origins of the international legal regulation

It has been already proved that the First World War and the interwar years became the time of active experimentation and development in the field of drone use. It was during this period that radio control was first used for aircraft, unmanned targets for military training, the first autonomous aircraft capable of carrying explosives, and the term "drone" was introduced. Although most of the projects of that time remained experimental, they laid the foundation for the further development of UAVs.

At the same time, the use of drones and remotely controlled weapons was not regulated in international law. However, certain international agreements that regulated the use of new weapons and military technologies and defined the rules of warfare already were in force.

The Treaty of Versailles[16] imposed severe restrictions on the development of German aviation, prohibiting it from having military aircraft, which, accordingly, affected the development of UAVs.

Concluded in the same year Paris Convention Relating to the Regulation of Aerial Navigation[17] became one of the most important international documents of the interwar period enshrined the principle of sovereignty of states over their airspace and created the basis for international regulation of civil aviation.

Established in 1922, the International Commission for Air Transport (ICAT):

- ensured the adaptation of the Paris Convention to new conditions, introducing changes caused by the development of air transport;
- harmonized technical standards for air navigation;
- resolved disputes between States Parties on technical issues;
- performed advisory functions for States Parties and the League of Nations;
- collect and disseminate information necessary for air transportation.

Despite the fact that the activities of the ICAT were mainly focused on the regulation of manned aviation, its standards and principles later became the basis for the legal regulation of the use of UAVs in the second half of the 20th century.

Since the disarmament of the defeated Germany was a condition of the 1919 Treaty of Versailles (and was carried out under the supervision of the League of Nations), restrictions and prohibitions on certain types of weapons were established by separate international treaties. For example, Washington Conference[18] established the maximum percentage of displacement of warships of the main classes and introduced the term "standard displacement"; Geneva

[16] Treaty of Versailles, *Treaty of Peace between the Allied and Associated Powers and Germany*, June 28, 1919.

[17] Paris Convention, *Convention Relating to the Regulation of Aerial Navigation*, October 13, 1919.

[18] Washington Naval Conference, *Washington Naval Treaty (Five-Power Treaty)*, February 6, 1922.

Protocol[19] prohibited use of asphyxiating, poisonous, other gases and bacteriological methods of warfare.

The means and methods of air warfare were not ignored as well. According to the resolution of the Washington Conference, a commission of lawyers was set up to prepare (on the basis of the provisions of the Hague Convention[20]) binding Rules of Air Warfare. The commission was chaired by Professor John Bassett Moore of Columbia University (USA) and included representatives of the United Kingdom, France, Italy, Japan and the Netherlands. The document developed by the commission in November 1922 – February 1923 was based on established customs and general principles of the existing laws of war.

From the very beginning, the commission members were aware of the impossibility of establishing quantitative or qualitative restrictions on military aviation, as no one could (and did not intend to) stop the technological progress in civil aviation. Regulation of air warfare by international legal acts seemed more effective. The Commission agreed that the Declaration Concerning the Prohibition of the Discharge of Projectiles and Explosives from Balloons or by Other New Analogous Methods[21] also covers cases of aerial bombardment by aircraft. However, as it was limited in scope (applying exclusively to States Parties), it was necessary to extend its effectiveness first.

Mindful of the atmosphere of terror caused by the indiscriminate bombing of cities during the First World War, the Commission nevertheless failed to agree on restrictions on the use of military aircraft. It only defined legitimate targets for air attacks. The rules prohibited Aerial bombardment for the purpose of terrorizing the civilian population, destroying or damaging civilian property, or injuring non-combatants was prohibited (Article 23), an obligation to protect hospitals, places of warship, scientific, charitable and historical monuments was set (Articles 25-26). On the other hand, military objectives, including troops, military factories, communications and transport used for military purposes, were recognized as legitimate targets for bombing. If there was a risk of indiscriminate damage to civilian objects, bombing was to be prohibited. At the same time, towns or individual buildings near a war zone could be legitimate targets, provided that they contained troops important enough to justify an attack.

In other aspects the draft of the Hague Rules of Air Warfare did not cause significant controversy. In particular, the idea of extending the laws of war on land and sea (Articles 17, 67), rules on distinctive signs and the rights and obligations of combatants (Articles 2-3, 7-8, 10, 13-16) to air warfare was approved. States Parties (whether belligerent or neutral) retained sovereignty over their own airspace and the right to restrict flights in wartime (Article 12). Certain issues, such as the use of certain types of munitions (Article 19), propaganda (Article 21), espionage (Articles 27-29), and the confiscation of enemy aircraft (Articles 30-32), were to be regulated by the laws of land warfare. Instead, the treatment of captured crew members, the sovereignty of neutral states, and the rules for searching, seizing and destroying enemy civilian aircraft were to be regulated rather in accordance with the laws of war at sea (Articles 39-43, 46-60). The provisions on the protection of crew members and passengers of aircraft escaping by parachute (Article 20) and forcing aircraft to land under the threat of weapons (Article 33) were an innovation. Although drones were not the main subject of discussion, their development was limited to general provisions on the control of new types of military equipment.

In the interwar period, issues of legal regulation of air navigation were actively discussed at the regional level. It is worth mentioning the Ibero-American Aeronautical

[19] Geneva Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or other Gases, and of Bacteriological Methods of Warfare, June 17, 1925.

[20] Hague Conventions, *Convention Respecting the Laws and Customs of War on Land (Hague IV, 1907)*, October 18, 1907.

[21] Hague Declaration, *Declaration to Prohibit, for the Term of Five Years, the Launching of Projectiles and Explosives from Balloons, and Other Methods of Similar Nature*. July 29, 1899.

Commission, which developed legal mechanisms for controlling air traffic in Latin America, and the Pan American Union, which was transformed into the Permanent American Aeronautical Commission in 1937. The latter was engaged in the unification and codification of international air law, which laid the foundation for the future standards of the International Civil Aviation Organisation (ICAO).

Conclusion

The period of the First World War and the interwar period (1914-1939) was a time of birth of UAVs, when the first military experiments were conducted to create aircraft capable of operating without a pilot. The hostilities demonstrated the potential of drones for reconnaissance, bombing and training, although their development was constrained by technological limitations. Nevertheless, active research in the field of remote control and flight automation began in the United States, the Great Britain, France, the Soviet Union and other countries. In particular, the American Kettering Bug of 1918 was one of the first attempts to create an unmanned cruise missile, and the British Aerial Target demonstrated interest in creating guided aircraft.

In parallel with technical development, the process of international legal regulation of the use of military aircraft (including UAVs) began. After the end of the First World War a number of international agreements were concluded that established (among other) the general principles of air operations. The Paris Convention enshrined the sovereignty of states over their airspace, and its Protocol contained the first mention of drones. In addition, the Hague Rules of Air Warfare were developed to impose certain restrictions on the use of aviation, in particular in terms of attacks on civilian objects, but they were not officially ratified.

Although there were no specific regulations on UAVs in the interwar period, general provisions of international law provided the basis for their future regulation (in particular, the principles of inviolability of airspace and restrictions on the use of new weapons influenced further discussions on the use of drones). In addition, the Geneva Protocol, which prohibited the use of chemical and bacteriological weapons, could theoretically be applied to UAVs if they were used to spray these substances.

Thus, the years of 1914-1939 defined the key areas of development of drones, combining military experiments with the formation of the first international legal approaches to its regulation. Although most UAVs projects remained experimental, the technological and legal foundations laid at that time became the starting point for the future development of drones during the Second World War.

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БЕЗПІЛОТНІ ЛІТАЛЬНІ АПАРАТИ У ПЕРІОД ПЕРШОЇ СВІТОВОЇ ВІЙНИ ТА В МІЖВОЄННИЙ ПЕРІОД (1914-1939): ВІЙСЬКОВІ ЕКСПЕРИМЕНТИ, ПОЧАТОК МІЖНАРОДНО-ПРАВОВОГО РЕГУЛЮВАННЯ

Анотація

Проведено аналіз появи та розвитку безпілотних літальних апаратів (БПЛА), або дронів, під час Першої світової війни та в міжвоєнний період (1914-1939). Автори дослідили перші військові експерименти у США, Великій Британії, Франції та СРСР, що заклали основи для майбутнього використання БПЛА у військовій сфері. Особливу увагу приділено таким прототипам, як американський Kettering Bug і британський Aerial Target, а також першим серійним моделям, зокрема OQ-2 Radioplane. Також досліджено початок міжнародно-правового регулювання використання військової авіації (Паризька конвенція, Гаазькі правила повітряної війни), що також стало основою для майбутнього регулювання використання БПЛА. Наголошено, що, незважаючи на технологічні обмеження, цей період був ключовим для формування інженерних концепцій та правових підходів, які вплинули на подальший розвиток дронів.

Ключові слова: *Безпілотний літальний апарат, БПЛА, дрон, Перша світова війна, військовий експеримент, міжнародне право, військова авіація*