

Satellite Navigation in Ukraine: Legal Frameworks and Implications for Space Security

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This article provides a comprehensive analysis of Ukraine's satellite navigation development, focusing on the evolution of its legal frameworks in the context of ongoing regional conflict. It examines historical and current aspects of Global Navigation Satellite System (GNSS) development in Ukraine, highlighting the intersection of technological innovation, international cooperation, and Ukraine's role in global space initiatives. Special attention is paid to the 2023 bill "On State Regulation in the Sphere of Satellite Navigation," emphasizing its critical role in national security and defense. The article underlines the need for robust legal and regulatory structures, professional expertise, and public-private collaboration to adapt to rapid industry changes and integrate effectively into the global space market.

Keywords: Satellite Navigation, Ukraine Legal Frameworks, Global Navigation Satellite System (GNSS), Space Law, National Security.

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Introduction

In today's globalized world, satellite navigation is indispensable across various sectors, ranging from personal mobility to international logistics and global security. Major satellite navigation systems like the GPS (Global Positioning System), GLONASS (Global Navigation Satellite System), and Galileo are integral to industries such as transport, agriculture, military operations, and emergency services.

The United States-developed GPS is renowned for its high precision and broad applications. Salvemini (2001) in the "International Encyclopedia of the Social & Behavioral Sciences" describes GPS as a radio wave receiver that provides exact positioning in space through signals

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from a constellation of orbiting satellites. Capable of extraordinary precision, GPS can pinpoint locations to less than a millimeter under optimal conditions and extended observation periods. Its most significant contribution to modern society lies in providing real-time geographical coordinates of any object on Earth's surface, greatly enhancing our knowledge with direct and cost-effective geographical data. Nevertheless, GPS usage does raise social issues, including concerns about privacy and the potential impact on natural orientation skills (Salvemini, 2001).

Galileo, developed by the European Union, is known for its heightened accuracy and reliability, especially in urban settings. Breeman, Grillo, and van de Kaa (2022) in "Journal of Engineering and Technology Management" posit that GPS and Galileo are likely to become the dominant GNSS systems, surpassing GLONASS. They emphasize the roles of technological superiority, operational supremacy, and brand reputation in GNSS standard dominance. The research indicates that GPS and Galileo are closely matched in these areas, while GLONASS appears to lag (Breeman et al., 2022).

However, Vidal and Privalov (2023) report in "Space Policy" that GLONASS is seeing significant advancements, with the Russian armed forces upgrading from the older GLONASS-M to the newer GLONASS-K satellites, reflecting Russia's dedication to improving and maintaining the system's relevance (Vidal & Privalov, 2023).

The integration of these satellite navigation systems plays a crucial role in enhancing the efficiency and accuracy of a myriad of processes, thus contributing significantly to global security, economic development, and sustainable resource management. These systems facilitate the precise positioning of objects on land, sea, and air by utilizing geographical coordinates to determine location, exact time, speed, and direction of movement. The effectiveness of satellite navigation hinges on the seamless integration of electronic-technical systems, which synergize ground and space-based equipment.

The legal framework governing these systems, particularly in aspects of positioning and communication, necessitates adherence to international legal norms. Prominently, the principles of international law, as outlined in the Charter of the United Nations, obligate states to engage in international cooperation across economic, social, cultural, and humanitarian domains, while also committing to the preservation of international peace and security. Additionally, the International Convention on the Use of Radio Broadcasting of 1936 plays a critical role, as it prohibits the dissemination of information from one state's territory that could potentially jeopardize the internal order or security of another state. Equally significant are the United Nations Principles that regulate the use of artificial Earth satellites for international live television broadcasting, as well as the Convention on the Distribution of Programme Carrier Signals Transmitted through Satellites, which collectively guide the operational standards and ethical considerations in this sphere (Galagan, 2013).

The Global Navigation Satellite System (GNSS) represents a technological breakthrough, revolutionizing various facets of our lives, including cartography and personal navigation. A key component of this system is the International GNSS Service (IGS), which comprises over 500 surveillance stations worldwide. These stations play a crucial role in providing three-dimensional positioning and speed determination, thereby enhancing the accuracy and reliability of the global navigation infrastructure (Ansari & Verma, 2017).

Legislative regulation of satellite navigation exhibits significant variability across different countries. Therefore, a detailed analysis of these regulations within specific national contexts is essential to fully comprehend the intricacies of the global navigation system.

Ukraine, as a proactive member of the GNSS community, maintains a robust network of GNSS observations. This network is vital for the country's cartography, geodesy, and navigation systems and underscores the significance of advancing indigenous space technologies and navigation systems.

A landmark in Ukraine's space endeavors was the launch of the "Sitch-2-30" satellite for Earth remote sensing on January 14, 2022. This event marked not only a technological milestone for Ukraine but also a significant contribution to the global navigation system (Nesterenko et al., 2021).

Consequently, this article centers on Ukraine, a nation with immense potential and aspirations in the space sector, albeit influenced by a complex historical and political landscape. These factors notably impact the evolution of its space legislation.

This research aims to dissect the evolution of Ukrainian legislation in the realm of satellite navigation, identifying pivotal challenges and opportunities within this domain, as well as evaluating Ukraine's position in the global space industry context. This analysis is intended to not only shed light on the specifics of Ukrainian satellite navigation legislation but also to highlight the significance of national contexts in shaping policies that bear implications for global space activities and security.

Historical Context

The evolution of space law in Ukraine, a pivotal chapter in the annals of aerospace jurisprudence, commenced in the second half of the 20th century when Ukraine was part of the Soviet Union. The genesis of Ukraine's practical space endeavors dates to 1951 with the establishment of a ballistic missile production facility in Dnipropetrovsk, initially known as "plant 586". This seminal facility underwent a transformation to become Pivdenmash. In 1954, Mikhail Yangel, a luminary in Soviet aviation engineering and a staunch advocate of storable propellant technology repurposed a division of this plant into an independent design bureau, designated OKB-586. This marked a significant departure from the prevailing preference for cryogenic propellants by Sergei Korolev at OKB-1 (later RKK Energiya), heralding a new era in space propulsion technology. The establishment of the Special Design Bureau 586, subsequently known as "Pivdenne (Southern)" and later as the Southern Design Bureau (KB Pivdenne), represented a milestone in the Soviet Union's space-related endeavours.

Dnipropetrovsk emerged as a linchpin in this development, hosting what was arguably the largest missile production entity in the Soviet Union and perhaps globally. Known as Yuzhmash ('Southern Machine-Building Factory') and later translated into Ukrainian as Pivdenmash, this entity housed a major design bureau, an R&D colossus that designed a majority of the Soviet ICBMs, including formidable systems like the "heavy" SS-18 and the solid-fuel railroad-mobile SS-24 (Nuclear, 2013).

The historic launch of the first Soviet artificial Earth satellite on October 4, 1957, signified a watershed moment in the annals of the space age, profoundly impacting both the USSR and the international community. This event precipitated a series of resolutions by the USSR's Council of Ministers, notably in March 1958, mandating OKB-1 under Serhiy Korolev to develop an array of spacecraft, including automatic lunar stations. Subsequent resolutions, particularly in September of that year, and the Soviet Council of Ministers Resolution No. 569-264 in May 1959, "On the preparation of humans for space flights," catalyzed the rapid advancement of the space industry, primarily within the USSR's technologically advanced republics.

Pivdenmash, later renamed the Southern Machine-Building Plant and eventually the Southern Machine-Building Production Union, or Yuzhmash (Ukraine), concentrated its efforts on the design and production of ballistic missiles, yielding a pantheon of significant systems such as the R-5M, R-12 Dvina, R-14 Chusovaya, R-16, R-36, MR-UR-100 Sotka, and the R-36M. During the zenith of the Soviet era, this plant boasted the capability to produce up to 120 ICBMs annually. By the late 1980s, it was designated as the primary manufacturing site for the RT-2PM2 Topol-M ICBM.

In the nascent years of the 1960s, Ukrainian organisations, including Pivdenmash, redoubled their efforts in developing and manufacturing sophisticated control systems, onboard automation, and other pivotal components for space apparatuses and complexes. Projects like “The Meteor” and “Arrow” are examples of how the “Southern” design bureau set out on a mission to incorporate cutting-edge technologies into spacecraft production. This period, extending from the 1960s to the 1980s, saw Ukrainian scientists and enterprises actively participating in an array of projects, spanning interplanetary station launches, manned space missions, unmanned spacecraft docking, and the construction of orbital stations (Okladna & Korchevska, 2021).

In a strategic move in 1960, the Soviet Council of Ministers promulgated a resolution “On the participation of the USSR in international organisations for the use of space for peaceful purposes.” This resolution defined the USSR’s and by extension Ukraine’s, engagement in international space activities. As an independent entity under the Space Treaty, the USSR, and subsequently, Ukraine, engaged with a multitude of international organizations, signing treaties and agreements that significantly contributed to the exploration and utilization of outer space (Okladna & Korchevska, 2021).

Post-Soviet Period and First Steps in Legislative Regulation (1991-2000s)

With the dissolution of the USSR, Ukraine inherited a substantial portion of the Soviet space infrastructure and technological assets. The nascent years of Ukraine’s independence were pivotal, marked by the formulation of a legal framework to underpin the burgeoning space industry. This era witnessed the development and implementation of legislation setting forth guidelines and standards for space activities, alongside the establishment of regulatory bodies. This juncture was instrumental in charting the trajectory of Ukraine’s autonomous space program, positioning the country as a full-fledged participant in international space law. The overarching objective transcended mere conservation of existing capabilities; it necessitated adapting them to the emerging political landscape, encompassing the revamping of erstwhile Soviet space programs and infrastructure, and instituting national entities to oversee space activities.

However, the legislative progression in space-related matters encountered hurdles, primarily due to economic challenges post-USSR disintegration. This period was characterized by rampant inflation, culminating in hyperinflation, the disintegration of long-established production networks, dwindling state budget revenues, and economic stagnation, all of which profoundly impacted state functions. A significant turnaround occurred in September 1996 with the adoption of the hryvnia currency, which played a crucial role in curbing inflation. The ensuing economic stabilization catalyzed a resurgence in the economy, bolstering budgetary allocations and fostering a conducive environment for investments in the space sector. Consequently, Ukraine began to enhance its engagement in international space endeavors (Okladna & Korchevska, 2021).

The establishment of the National Space Agency of Ukraine (NSAU) in 1992, through a Presidential Decree, was a strategic milestone in affirming the autonomy and developmental prospects of Ukraine's space industry's scientific, technical, and production potential. This decision aimed at the preservation and efficacious utilization of this potential to address socio-economic challenges within the country.

Endowed with a broad spectrum of responsibilities in the realm of space research and utilization, the NSAU undertook the formulation of conceptual state policy tenets in space research, proffering recommendations to senior state authorities, orchestrating the coordination of diverse institutions and organizations in the space sector, and spearheading international collaborations. These responsibilities spanned an extensive array of activities related to the exploration and utilization of outer space (On the Establishment, 1992).

The 1992 Presidential Decree was a foundational step in delineating the core principles and strategic directions for Ukraine's space industry. This directive also secured funding for research and development in this domain. A crucial facet of this era was Ukraine's integration into international space organizations, significantly bolstering the country's space industry.

The enactment of the Law of Ukraine "On Space Activities" subsequent to the creation of the NSAU established a comprehensive legal framework governing space activities within and beyond Ukraine. This legislation emerged as the cornerstone document defining the legal underpinnings of all facets of space activities, aligning them with both national and international norms and standards (On Space, 1996).

The Law on Space Activities provides an expansive legal scaffold for various aspects of space exploration and utilization, encompassing the legal oversight of the development, application, and management of space technologies and infrastructure, including satellite navigation. Although specific provisions dedicated to satellite navigation are in the nascent stages of implementation, the law's promulgation has laid a robust foundation for the ongoing evolution of space activities in Ukraine.

The Beginning of the 2000s and the Integration of Ukraine into European and Global Space Programmes

At the dawn of the 21st century, Ukraine embarked on a proactive journey towards integrating into European and global space programmes. This era was marked by the country's concerted efforts in the advancement of its space industry and the harmonization of national legislation with international standards. The collaboration with the European Space Agency (ESA) and participation in various international agreements were pivotal in this transformation.

The 2008 agreement between the Government of Ukraine and the European Space Agency heralded a significant phase in cooperative endeavors in satellite navigation, among other areas. Although this agreement was discontinued in 2019, its impact on the legal and operational frameworks of joint projects in space science, telecommunications, and satellite navigation was profound. Article 2 of this agreement underscored satellite navigation as a principal area of collaboration, encompassing the development and application of telecommunications technologies. The agreement facilitated an array of cooperative ventures including information exchange, joint research, and technology development, pivotal for the advancement of satellite navigation in Ukraine and its assimilation into European space initiatives (On Cooperation, 2008).

Another critical milestone was the Agreement on Cooperation in the Field of Civil Global Navigation Satellite System (GNSS) with the European Community and its Member States. Signed in December 2005 and ratified by Ukraine in January 2007, this agreement became effective for Ukraine in December 2013. It encompassed comprehensive cooperation in GNSS technologies, aligning with global navigation networks, fostering innovation, developing regulatory and legal frameworks, facilitating Ukrainian companies' access to the market, ensuring security, and promoting skill development through training programmes. This agreement laid the groundwork for Ukraine's integration into the European GNSS system, thereby significantly contributing to the nation's technological prowess and economic expansion (Agreement, 2007).

The 2010s: Innovation and Development in Satellite Navigation

During the 2010s, Ukraine embarked on a concerted effort to incorporate state-of-the-art technologies in the space industry, particularly in the domain of satellite navigation. A landmark development was the designation of the National Space Agency by the Cabinet of Ministers of Ukraine (Some, 2009) as the specialized entity responsible for coordinating satellite navigation and international cooperation. This agency was charged with the development of legislative drafts to regulate satellite navigation and to certify coordinate-time and navigation systems utilizing global navigational systems. Ambitious pilot projects aimed at deploying satellite navigation technologies across various sectors, including industry, transport, communications, healthcare, and ecology, were slated for commencement in 2012 (Some, 2009).

A significant legislative stride in regulating satellite navigation was taken in early 2013. The Cabinet of Ministers of Ukraine approved the concept of the draft law "On State Regulation in the Sphere of Satellite Navigation" (On Approval, 2013). This foundational document outlined the prevalent challenges and proposed legislative solutions, encompassing aspects such as public procurement organization, national production support, producer responsibility regulation, global navigation systems' safety, cutting-edge technology adoption, and national standards development. The concept aimed to establish legal, economic, organizational, and financial principles in this sphere, reflecting the increasing practical applications of global navigation systems in diverse areas, including defense and state security. Anticipated outcomes included the stimulation of the domestic navigation services market, technological advancements in science-intensive sectors, job creation, and enhanced public access to high-quality services and products through the utilization of modern domestic satellite navigation equipment (On Approval, 2013).

In 2013, the draft law "On State Regulation in the Sphere of Satellite Navigation" was formulated, seeking to establish a robust legal framework to foster the efficient use and growth of this sector (Draft Law, 2013). However, the failure to enact this draft law has raised concerns about the efficacy of state policy in this arena. The absence of this legislation leaves a significant portion of satellite navigation-related issues without proper legal oversight, thereby hindering the development and global integration of Ukraine's satellite navigation capabilities.

Overview of the 2016 Ukrainian Draft Law on State Regulation in Satellite Navigation

In 2016, amidst an escalating focus on regulatory measures within the satellite navigation sector, Ukraine grappled with the pivotal challenge of implementing the Draft Law “On State Regulation in the Sphere of Satellite Navigation” (Draft Law, 2016). This Draft Law represented a significant effort to forge a comprehensive legal, economic, and technical scaffold for fostering the development and efficient regulation of the satellite navigation sector.

Key facets of the law encompassed:

State Regulation: The Draft Law aimed to establish a cohesive state policy supporting satellite navigation activities, optimizing the utilization of scientific and technical resources for the national economy, defense, security, and social welfare. This initiative sought to harmonize state policy with the intricate dynamics of satellite navigation, underscoring the need for a unified approach to leverage this technology’s potential.

Established Directions of State Policy and Activities: The Draft Law set out specific conditions for the development of equipment related to co-navigation production. Emphasis was placed on fostering national technologies that provide support and economic advantages, aligning with existing security policies. A critical aspect was the safeguarding of information resources in line with current state policies. This approach was designed to nurture a sustainable ecosystem for satellite navigation, encompassing technological innovation, economic viability, and security considerations.

The 2016 Draft Law thus proposed a paradigm shift in the strategic management and regulation of Ukraine’s satellite navigation sector. By aligning state policy with the nuanced requirements of this high-tech field, the law sought to position Ukraine at the forefront of global satellite navigation development, leveraging it for enhanced economic growth, national security, and societal benefit.

2019: A New Phase of Legislative Reform in Satellite Navigation

In 2019, Ukraine embarked on a critical phase of legislative reform in the field of satellite navigation with the development of Draft Law No. 10198. This initiative signified a significant advancement from the foundational regulatory framework established by the 2016 Draft Law (Draft Law, 2019). The revised Draft Law introduced several innovative provisions aimed at establishing a comprehensive legal, economic, organizational, and financial groundwork for managing satellite navigation activities. Key features of the 2019 Draft Law encompassed:

Legislative Definition of Public Policy Principles: The law proposed the establishment of a cohesive public policy in satellite navigation, tailored to the needs of the national economy, defense, and security sectors.

Distribution of Powers Between Authorities: It emphasized the unity of rules and activities through the delineation of authority among ministries and central executive bodies.

Program-Target Planning: The law advocated for the implementation of program-target planning for satellite navigation activities within the ambit of state scientific and technical programs.

Harmonization with International Norms: A crucial aspect was ensuring the compatibility of activity regulations with international standards, facilitating Ukraine’s integration into the global space context.

Draft Law No. 10198 of 2019 represented a pivotal step towards crafting a holistic and harmonized legislative environment conducive to the development of satellite navigation in Ukraine. It mirrored global trends and demands, steering the country towards technological innovation and progressive development in this vital sector.

Further advancing the legislative framework, in 2021, the Ministry of Strategic Industries of Ukraine initiated the development of a new draft Act “On State Regulation of Satellite Navigation.” This initiative was part of a comprehensive government plan to implement various actions, including task 130 of the 2021 Government Priority Action Plan, task 52 of the Legislative Work Plan of the Verkhovna Rada of Ukraine for 2021, and article 371 of the Association Agreement between Ukraine, the European Union, the European Atomic Energy Community, and their Member States. These efforts were aligned with broader strategic objectives, as outlined in various government decrees and resolutions.

The 2021 Draft Law introduced adjustments in definitions and management structures compared to its 2019 predecessor. Notably, it updated the roles of industry and state registrars and the framework of the state satellite navigation system. These modifications aimed to clarify administrative responsibilities and enhance the organizational architecture, thereby ensuring efficient regulation and growth of satellite navigation in Ukraine. This legislative evolution exemplifies the government’s systematic and consistent approach to fostering this technologically critical sector, aligning with current international requirements and global trends.

Comparative Analysis of Draft Laws 2021 and 2019 regarding Satellite Navigation

A critical examination of the 2021 and 2019 Draft Laws in satellite navigation reveals several noteworthy amendments indicative of the progressive maturation of Ukrainian legislation in this domain.

Terminology Changes: Article 1 of the Draft Laws exhibits terminological variances. The 2021 Draft Law redefines industry and state registrars as personnel in employment relations with government entities, contrasting with the 2019 version that aligned these roles with the central executive body. This shift signifies a nuanced approach to the roles and responsibilities within the satellite navigation management system.

Legislative Regulation Expansion: The 2021 Draft Law broadens the scope of international agreements and domestic laws governing satellite navigation. This expanded regulatory framework accommodates the industry’s diversity and dynamism, diverging from the 2019 Draft Law’s narrower focus on the GNSS Agreement.

Diverse State Regulation Objectives: The 2021 Draft Law, in Article 3, delineates a comprehensive array of state regulation objectives, encompassing economic, defense, security, and social dimensions. This contrasts with the 2019 version, which primarily focused on the coordination of unified state policy implementation, indicating a more holistic approach to sector development and regulation.

Enhanced Allocation of Powers: Article 4 of the 2021 Draft Law augments the Cabinet of Ministers of Ukraine’s responsibilities, incorporating satellite navigation into state programs and assigning specific duties to the central executive body, such as coordination and international cooperation.

Expanded Scope of Activity: Both Draft Laws in Article 5 characterize satellite navigation activities as encompassing system usage, scientific research, monitoring, and equipment

development. The 2021 Draft Law, however, provides a more detailed delineation, reflecting the sector's increasing specialization.

Elevated Role of Security Service: The 2021 Draft Law's inclusion of the Security Service of Ukraine in decision-making on restrictions underscores a heightened focus on national security, recognizing the necessity of a comprehensive security strategy in the face of global challenges.

Local Government Involvement: The 2021 Draft Law emphasizes the role of local governments in developing and overseeing navigation systems, a departure from the 2019 law which primarily entrusted these tasks to executive authorities. This change underscores the significance of decentralized governance in satellite navigation, enhancing responsiveness to local needs and the versatility of satellite technologies.

Collectively, these Draft Laws mirror Ukraine's commitment to refining its legislative framework to align with contemporary demands and realities. They underscore the nation's ambition to not only incorporate cutting-edge technologies but also to cultivate a suitable legal and organizational ecosystem for their efficacious utilization. These legislative advancements represent pivotal strides in bolstering national security, fostering local governance, and propelling Ukraine's integration into the global space arena.

Development of Legal Regulation in Satellite Navigation in Ukraine: Presidential Decree No. 884/2022

Presidential Decree No. 884/2022, issued on December 23, 2022, represents a significant milestone in the evolution of legal regulation in the sphere of satellite navigation in Ukraine (On the Decision, 2022). This decree articulates the legal basis for the decision of the National Security and Defence Council of Ukraine, titled "On measures for the development and use of domestic satellite navigation systems in the interests of the security and defense of the state" (On measures, 2022).

The decision encapsulates a strategic response to the multifaceted challenges confronting Ukraine in satellite navigation. It addresses the imperative for effective systemic state regulation, the rectification of existing regulatory framework deficiencies, and the establishment of oversight and control mechanisms for domestic functional extensions to global navigation systems.

A pivotal outcome of this decision is the directive to the Cabinet of Ministers of Ukraine to formulate and submit the Draft Law "On State Regulation in the Sphere of Satellite Navigation." This Draft Law, conceived in reaction to contemporary challenges and threats, envisages a structured and regulated approach to the development and utilization of satellite technologies by the state. It entails introducing an unambiguous legal framework governing satellite navigation activities, fostering technological advancement, ensuring national security, and augmenting the country's defense capabilities. The overarching goal of this Draft Law is not merely the promulgation of new norms and standards but also the enhancement of domestic satellite systems, their amalgamation with international networks, and the facilitation of their efficacious application across diverse sectors, ranging from defense to civilian utilities.

In the context of Ukraine's current geopolitical and security landscape, marked by military conflict and external threats, the refinement of legal regulation in satellite navigation is of paramount importance. Satellite navigation systems are integral to national security and defense, underscoring the necessity for Ukraine to ensure resilience and self-reliance in this domain.

Presidential Decree No. 884/2022, alongside related legislative initiatives, mirrors Ukraine's strategic intent to bolster its defense posture through the advancement of indigenous satellite

technologies. This underscores the criticality of autonomy and self-sufficiency in satellite navigation, particularly in reducing reliance on external systems during exigent circumstances.

The decision to amplify the involvement of the Security Service of Ukraine in regulatory processes within satellite navigation and to empower local authorities in the development and surveillance of navigation systems signifies a recognition of the need for a holistic and multi-tiered approach to this issue. Such coordination among various levels of governance and agencies enables a more effective response to threats, ensuring alignment and expeditious action in crisis situations.

These legislative developments not only fortify the country's security and defense capabilities but also lay the groundwork for technological progress, enhance Ukraine's international competitiveness, and unlock new prospects for the civilian sector. This is particularly pertinent in the face of modern challenges where satellite technology plays a crucial role across a spectrum of applications, from defense to agriculture, infrastructure development to emergency management.

Development of the legislation of Ukraine in the sphere of satellite navigation in 2023

In March 2023, in response to the decision of the National Security and Defence Council of Ukraine of December 23, 2022, the draft Law of Ukraine 'On State Regulation in the Sphere of Satellite Navigation' was published. This decision was put into effect by Presidential Decree No. 884/2022 and became part of Step 203 of the Priority Action Plan of the Government of Ukraine for 2023, approved by the Cabinet of Ministers of Ukraine Decree of 14 March 2023 No. 221-p. It also corresponds to task 150 of the Plan of draft work of the Verkhovna Rada of Ukraine for 2023 approved by Resolution No. 2910-IX of 7 February 2023, as well as to article 371 of the Association Agreement between Ukraine and the European Union, the European Atomic Energy Community, and their Member States, and the task 1896 of the plan of measures for the implementation of this agreement approved with the Resolution of the Cabinet of Ministers of Ukraine of 25 October 2017 No. 1106, following paragraph 2 of the Order of the cabinet of ministers of 3 January 2013 No. 1-r "On approval of the Concept of the draft Law of Ukraine "On State Regulation in the Sphere of Satellite Navigation."

The Draft Law 2023 and its differences from the Draft Law 2021 The Draft Law 2023 is today a key document that reflects the strategic vision of Ukraine in the field of satellite navigation, emphasizing the need to develop its technologies and systems. The Draft Law also emphasizes the importance of international cooperation and integration of Ukraine in global space initiatives, which opens new prospects for the country in international space programmes and projects. Such cooperation has the potential to contribute to better use of satellite technologies, development of scientific research, and technological progress. Particular attention in this draft law is paid to ensuring national security and enhancing the technological potential of Ukraine in the context of the global space community.

A detailed analysis of the 2023 Draft Law compared to the previous version (the 2021 Draft Law) reveals the following key aspects: Basics of public policy and rules of activity: The basic principles of state policy in the field of satellite navigation and the rules of activity in this field are defined. This creates a clear framework for the development and regulation of satellite navigation in the country.

Powers between State Authorities: The powers between the various state authorities in the implementation of state policy in the sphere of satellite navigation, which ensures coordination and efficiency in the management of this sphere, are determined.

Component activities and conditions of restriction: It establishes components of activities in the field of satellite navigation and conditions for limiting such activities, which are important for national security and defence.

Terms of provision and use of services: The terms of provision and use of satellite navigation information services are regulated, ensuring their availability and quality.

Registration of functional add-ons and information systems: Procedures for registration of functional add-ons and navigation information systems are defined, which facilitates their effective use and control.

The 2023 Draft Law marks several key updates and differences compared to the 2021 Draft Law, which indicates the strategic development in the field of satellite navigation in Ukraine: **Changes in funding:** The new Draft Law introduces more flexible and diverse financing mechanisms, including public-private partnership, own funds of navigation entities, and attracting foreign capital. This expands the opportunities for the development of the sector.

A more structured and comprehensive approach: The 2023 Draft Law proposes a more detailed and inclusive approach, including enhanced definitions and terms, which contributes to clarity in the regulation of activities in the field.

Renewal of powers of state bodies: In 2023, more attention is paid to the distribution and specification of functions and powers between the various government bodies, ensuring effective coordination and clarity in the decision-making process.

Special regime in times of war: The draft law introduces special provisions for working in times of war and emergencies, reflecting the need to adapt to changing conditions and ensure national security.

General modernization and adaptation to contemporary challenges: The 2023 Draft Law demonstrates the overall trend of updating and modernizing Ukrainian legislation in the sphere of space activities and satellite navigation, making it more adapted to modern technological, economic, and security challenges.

Therefore, it is advisable to note that the Draft Law 2023 reflects a comprehensive and flexible approach to the financing of the sphere of satellite navigation, offering various sources of financing. These innovations adapt Ukrainian legislation to modern challenges, providing flexibility and stability in the development of satellite navigation.

Conclusions

This article offers an in-depth exploration of the evolution and future trajectory of satellite navigation in Ukraine, underscoring the pivotal role of national legislation, particularly in the backdrop of the ongoing conflict in the country. By examining both historical and contemporary facets of Global Navigation Satellite System (GNSS) development in Ukraine, the article highlights the critical importance of technological innovations, international collaboration, and Ukraine's contribution to global space initiatives.

A focal point of this analysis is the 2023 bill "On State Regulation in the Sphere of Satellite Navigation." This legislation emerges as a cornerstone in bolstering national security and harnessing satellite technologies for defense and intelligence operations. It is instrumental in ensuring the dependability of communications, navigation, and surveillance, especially under

wartime conditions. The bill also underscores the necessity of a holistic approach to regulating the satellite navigation sector.

To forge ahead in this field, Ukraine needs to fortify its regulatory and legal infrastructure, enhance the expertise of professionals in the sector, and foster effective synergy between government bodies and the private sector. The future of satellite navigation in Ukraine hinges on its agility to adapt to rapid industrial transformations and to seamlessly integrate into the global space market. The concerted efforts in these areas will not only strengthen Ukraine's position in satellite navigation but also contribute significantly to its technological sovereignty and economic resilience.

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