

State Regulation of the Space Industry – the Key to Effective National Security

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ABSTRACT

State regulation of the Aerospace industry through strategies, development programs, financing, incentives and support is a priority factor in achieving its growth. The Aerospace industry also provides an increase in the level of national security through the growth of scientific, production potential of the country's economy. This article examines modern approaches to state regulation of the Aerospace industry as part of effective national security of Ukraine based on a content analysis of regulations, practice of State bodies responsible for industry regulation, forms and tools of state regulation of the industry. The concept of "State regulation of the Aerospace industry" is determined as a set of legislative, institutional, organizational, financial actions, measures, methods of establishing economic relations between legal entities and individuals in order to ensure a high level of security, protection of business entities at International, national and regional management levels. It is determined that during the twenty years of functioning of the Aerospace industry in Ukraine the approaches to state regulation have been changed in order to ensure national security. This includes the liberalization of the industry and the strengthening of international cooperation, exchange of experience and research in the field for the integration of space technology and information systems into the national security and defense system. Intensification of State regulation of the Aerospace Industry began in 2014 with the strengthening of European integration and provides for the development of mechanisms of State regulation within the following areas: institutional (intensification of SSA and agencies, strengthening cooperation with other ministries, international space organizations, accountability), financial (expansion of funding from international organizations, state budget funds for financing projects by areas), organizational (development of various forms and instruments of state regulation programs of cooperation with foreign countries, exhibitions, participation in international organizations, interaction with international companies, participation in international organizations, international projects, budget programs, public procurement).

Keywords: *State regulation of the space industry, State regulation of the Aerospace industry, National security, aerospace industry.*

1. INTRODUCTION

Science and capital intensity are the main factors in ensuring the innovative technological development of the economy, in particular the Aerospace industry. State regulation of the Aerospace industry through strategies, development programs, financing, incentives and support is a priority factor in achieving its growth and provides an increase in the level of national security through the growth of scientific, production potential of the country's economy.

In Ukraine, the space industry needs to improve government regulation, especially in the face of growing

national security risks [1]. The Law of Ukraine "On National Security of Ukraine" 2469-VIII of 24.10.2020 [2] provides for the development of the defense-industrial complex (DIC) of Ukraine (article 30) based on the National Security Strategy [2; 3], the Defense-Industrial Development Strategy complex [4]. The latter includes modernization of the defense industry, capacity building, institutional capacity, optimization of asset management in the aviation, armored and shipbuilding sectors of the economy, business development, joint venture development, foreign capital attraction, integration of models of vertically integrated structures and other state regulation. The development of "High-tech sectors of the

defense industry, science and innovation, in particular through the creation of specialized institutions" is one of the main goals Strategy of Development (DIC).

In fact, the space industry affects the level of national security through the state's defence capabilities to protect national interests. As Psyuk M.O. notes [5] "The level of development of rocket and space technology largely determines the defence potential of the state".

Thus, certain trends in the strategic development of the regulatory framework form the basis for the formation of science-intensive, capital-intensive Aerospace industry in order to ensure national security. This actualizes the study of state regulation in this area. The works of Zbrutsky O.V, Lukomsky V.G, & Ponomarenko, S.O [6], Psyuk M.O [1; 5], Pshyk-Kovalska, O.O, Mirzoeva, D.R [7], Sazonets O., Valiullina Z. [8], Udovytska E.A [9] and other scientists are devoted to the study of state regulation of the Aerospace industry as part of the effective national security of the state. At the same time, in these studies there is no comprehensive study of the results of the transformation of the concept and approaches to state regulation of the aerospace industry as part of effective national security.

2. AIM

The aim of this article is to study the practice of state regulation of the Aerospace industry as part of effective national security of Ukraine. To achieve this aim a comprehensive study of content analysis of regulations, practices of state bodies responsible for regulation industry, forms and tools of state regulation of the industry has taken place.

3. RESEARCH RESULTS

State regulation of the Aerospace industry as part of the effective national security of the State, will be considered as a set of legislative, institutional, organizational, financial actions, measures, methods of establishing economic relations between legal entities and individuals to ensure a high level of security, protection of business interests internationally, nationally, regional levels of government. Thus, the study focuses on the study and generalization of the work (actions, measures) of institutions that ensure state regulation and implementation of state regulatory policy in Ukraine. The practice of the institutes depends on the legislation, the organization of the work of the subjects of state regulation of the aerospace industry, in particular the organization of work, international cooperation, funding through the involvement of various sources.

The State Space Agency of Ukraine (SSA) carries out state regulation of the development of the aerospace industry.

Regulatory and legal acts regulating the industry are available on the SSA website. Among the main legislative

documents are the Constitution of Ukraine, Laws of Ukraine. Regulations of the President of Ukraine, regulations of the Cabinet of Ministers of Ukraine, regulations of the State Space Agency of Ukraine and the regulations of other central executive bodies of Ukraine. The normative base contains the Laws of Ukraine.

"On Space Activities" of November 15, 1996 № 502/96-BP (hereinafter the Law № 502/96-BP). "On State Secrets" of January 21, 1994 № 3855-XII. "On State Control over International Transfers of Military and Dual-Use Goods" of February 20, 2003 № 549-IV. "On International Treaties of Ukraine", dated June 29, 2004 № 1906-IV. "On the management of state property" from 21.09.2006 № 185-V. "On approval of the National target scientific and technical space program of Ukraine for 2013-2017" dated 05.09.2013 № 439-VII. "On the State Budget of Ukraine for 2015" dated 28.12.2014 № 80-VIII. "On licensing of economic activities", from 02.03.2015 № 222-VIII. "On administrative services" dated 06.09.2012 № 5203-VI [10].

According to the Law № 502/96-BP [2] "Space activities – scientific space research, creation and application of space technology, use of outer space". The object of this activity, include material objects that, 'are exploited' both in outer space and on the Earth's surface, which means the development of terrestrial infrastructure.

Law № 502/96-BP, states. The spheres of State regulation of the branch legislative definition of the principles of functioning, rules, norms. Development of public policy concepts, in the interests of security. Implementation of the target scientific and technical space program; financing, planning of the Aerospace industry, activities organizations of various forms of ownership attracting various sources of funding; targeted training of labour resources from the State budget and licensing of State activities.

One of the main strategic documents is the Strategy of space activities of Ukraine for the period up to 2022 (hereinafter the Strategy) [11].

The document identifies the main problems, including: the activities of enterprises based on the principles of the USSR. Preservation of production traditions for more than 20 years due to international space projects, completion of production of previous models and modifications, slow pace of technology implementation, lack of cooperation between departments and ministries, private enterprises and research institutions, focus on state budget funding, state guarantees as a form credit. Trends in the development of state regulatory mechanisms in 2014-2020 provide solutions to such problems, including the development of modern space systems for national security and defense, science and education, stimulating high-tech development, legislative changes and expanding economic ties (especially in 2017-2020), introduction of modern technologies of infrastructure

analysis. In the context of national security, the integration of space technologies and information systems ("remote sensing services for geographic information systems for various purposes", navigation and satellite systems) [11].

The concept of implementation of state policy in the field of space activities for the period up to 2032 [12] determines the main expected results of the development of state regulation in accordance with the Action Plan. The development of space technology is a priority in order to ensure national security and defense. The following measures are defined, within this direction [12]:

1. Ensuring the systematic acquisition of data from the domestic space system of Earth observation and geophysical monitoring "SICH", as well as foreign spacecraft (in the framework of joint international programs and agreements) with the space segment [12].

2. Establishment of a national Geo-information support system and emergency monitoring, as part of the European Global Monitoring for Environment and Security (GMES). The Global Earth Survey System (GEOSS), to create an internal market for space data, development and implementation of metrological technologies for their processing, creation of regulatory framework, development of international cooperation and ensuring the operation of its information services by interested users [12].

3. Creation and maintenance of operation of the national digital satellite telecommunication infrastructure of delivery of national television and radio programs to transmitters of terrestrial digital television and radio broadcasting of Ukraine with use geostationary spacecraft communication and broadcasting "Lybid" [12].

4. Creation of a system of coordinate and time navigation support of Ukraine using information obtained from global navigation satellite systems of different countries (USA, Russia, EU countries, China) [12].

5. Creation of an integrated multifunctional system of control and analysis of outer space with control of low-orbit space objects and support of their catalog [12, 13].

6. Provision. At the request of State bodies, exercising powers in the field of national security and defence. Provision of satellite communication and data retransmission services, coordinated time and navigation support, control and analysis of the space situation. Guaranteed and prompt provision of information received from remote sensing satellites and technical support for the creation of modern technologies for its special use; - creation of multifunctional technical means" [12].

SSA implements state regulation of the space industry in accordance with the Law of Ukraine "On Principles of State Regulatory Policy in the Sphere of Economic Activity" (hereinafter - Law № 1160-IV) [14] and other regulations on state regulatory policy for systemic, sustainable, consistent decision-making in the field of

state regulation, ensuring transparency, accountability and publicity of policy.

Therefore, the SSA solves the following tasks in accordance with current legislation in the field of State regulation [15] planning the development and preparation of regulations governing space activities; improving aerospace relations between economic agents. Control over the economic feasibility and effectiveness of regulatory decisions; ensuring the publicity of draft regulations in the decision-making process in the field of state regulation. Analysis of regulatory measures, methods, tools to influence national security; study of the effects and effectiveness of measures and decisions. Information openness through the involvement of citizens in the discussion of projects in the field of state regulation.

The Department of Legal and Contractual Work is a structural unit responsible for state regulation and policy of economic relations, in particular at the international level. The main principles of state regulation are taking into account the opinion of citizens, transparency, mandatory consideration and consideration of proposals of citizens, comments in accordance with the law, notification of decisions of society, informing about measures in the field of state regulation.

The plan of activity of the SSA on the implementation of regulatory policy contains a plan for the preparation of regulatory documents, in particular.

- 1) for 2020 on the approval of the National Target scientific and technical space program of Ukraine for 2020-2024 and the Rules of registration of spacecraft in Ukraine, in accordance with Part 13 of the Law № 502/96-VR [16].

- 2) for 2019 on approval of the Resolution of the Cabinet of Ministers of Ukraine "On ensuring state control over foreign economic activity in space" and the Resolution of the Cabinet of Ministers of Ukraine "On approval of the Rules of registration of spacecraft in Ukraine".

- 3) For 2018 on approval of the Law of Ukraine "On state regulation in the field of remote sensing of the Earth", the Law of Ukraine "On amendments to the Law of Ukraine on licensing of economic activities", the Law of Ukraine "On state regulation in the field of satellite navigation" [17].

4. DISCUSSION OF RESULTS

One of the shortcomings of state regulation in order to ensure the national security of the Aerospace industry is the need to coordinate draft regulations with various ministries: The Ministry of Foreign Affairs, the Security Service of Ukraine. The Ministry of Digital Transformation. The Ministry of Economy. The Ministry of Finance. This can lead to risks of late decision-making in emergencies that threaten national security.

Accordingly, the decision may be to plan the adoption of regulatory acts.

The SSA identifies priority areas of work, in particular for 2020 compliance with the principles of information openness and policy transparency, improving the legal framework through changes in other regulations, timely updating of information, quality content, monitoring the results of regulatory changes. Therefore, we can assume that in Ukraine there are positive trends in the implementation and integration of the principles of state regulation in the activities of the SSA (adequacy, balance, feasibility, efficiency, transparency, taking into account public opinion).

In the context of national security, the Ukrainian-Chinese Subcommittee on Space Cooperation the Commissions on Cooperation between the Government of Ukraine and the Government of the People's Republic of China are developing international bilateral cooperation to ensure peace. This includes: the implementation of joint projects worth \$ 70 million. in the space industry, the establishment of a Laboratory for research, the exchange of information on the status of implementation of agreements. In addition, the sector of science and industry is involved in the processes of international cooperation: SI SDP "Arsenal", SC "DO" Yuzhnoye", LTD RP "Hartron-Arkos", NAECY, NCFCTC, PJSC "EPWEIEW by E.O. Paton", NTU "KPI" [15].

In the field of space activities, there is cooperation for the regional development of the SSA and the Organization for Democracy and Economic Development of GUAM (regional association of four states: Georgia, Ukraine, the Republic of Azerbaijan and the Republic of Moldova). In particular, cooperation involves the protection of national interests of countries through the efficient use of resources in the implementation of joint projects.

SSA also participates in the meetings of the International Space Exploration Coordination Group (ISECG), to implement the following main activities.

1) Implementation of a project to build a power plant for the lunar base to obtain solar energy based on innovative electrolysis technologies for rocket fuel production.

2) Implementation of a project to develop a 'Cub-sat' in a 'Sel-enocentric' orbit to provide an image of the Moon from several viewpoints in order to visualize the terrain, measure spectral changes on the surface of the moon.

3) Creation of a solar thermoelectric generator for the purpose of renewable energy production. The co-operation implemented, on a Memorandum with the Moon Village Association, through participation in life integration projects on the Moon. For example, the specialists of the design bureau "South" were engaged in developing a conceptual design plan for the industrial

research lunar base, namely the appearance, transport system to deliver the crew, cargo, vehicles on the surface of the moon.

In addition to cooperation with international organizations and bilateral agreements, cooperation programs in Ukraine, the SSA together with the Ministry of Infrastructure of Ukraine are implementing national cooperation plans [17; 18; 19]. This includes the development and integration of technologies for obtaining satellite data for monitoring, analysis of infrastructure, including roads, combating smuggling, illegal extraction of natural resources, and prevention of illegal situations. In fact, this involves the protection of national infrastructure through the monitoring of facilities not only in the space industry, but also in other sectors of the Ukrainian economy (infrastructure and education, security and agricultural projects).

The Aerospace sector is funded by 'The Horizon 2020 funding mechanism' in three areas. (European Research and Innovation Program): industry leadership (€ 17 billion), advanced science (€ 24.4 billion), societal challenges and challenges. (29.7 billion euros). This is in line with the priorities of the Europe 2020 program and the priorities of the Innovation Union. In particular, the direction of advanced science provides funding for advanced research, training and career development of young scientists in the field, support for research infrastructure and more. Within the direction of industry leadership, it is planned to finance information and communication technologies, nanotechnologies, new materials, biotechnologies, advanced production technologies and space technologies [20].

The international activities of institutions in the development of state regulation also include international cooperation with the following international space organizations. The UN Committee on Space Exploration and Use (since 1992). The Committee on Satellite Surveillance of Earth (since 1993). The Committee on Space Research unions (since 1996). International Space Communications Organization (Inter-satellite) since 1997. International Maritime Satellite Communications Organization since 1979. International Astro-nautical Federation (IAF) since 1993. Forum of Space Agencies (SAF) since 1996. Missile Technology Control Regime (RCT) since 1995 [21].

In space area, Ukraine co-operates with the EU, North and South America, in the Asia-Pacific region with China, the Middle East (Turkey, UAE), the CIS (Kazakhstan, Belarus, Azerbaijan). The main partner countries in this area are the United States, Canada, the UAE, China, the Republic of Korea, the Netherlands and Mexico. Thus, the share of high-tech exports of Ukraine was 7.53% in 2014 (no data for 2008), in 2018 - 5.41%, which is low compared to partner countries (Table 1). This means the potential for the development of the space industry

through the adoption of experience in government regulation to ensure national security.

Compared to Ukraine, in the UAE the share of high-tech exports of Ukraine in 2008 was 3.36%, in 2018 - 10.79%, in China - 29.39% and 31.44%, respectively, in the EU - 15.36% and 15.58%, respectively, in Mexico - 20.59% and 21.08%, respectively, in the Netherlands - 25.96% and 22.12%, respectively, in the United States - 28.97% and 18.90%, respectively. Therefore, these countries have a much higher level of protection of national interests in all spheres of life compared to Ukraine.

Table 1. Dynamics of the share of high-tech exports from Ukraine and partner countries in the space industry from 2008 to 2018. Percentage of exports

Country	00 8	01 4	01 5	01 6	01 7	01 8	Diver gence +/-
UAE	,3 6	0, 36	,3 1	0, 90	1, 89	0, 79	7,43
China	9, 39	9, 70	0, 43	0, 25	0, 89	1, 44	2,05
EU	5, 36	6, 79	7, 41	7, 58	6, 00	5, 58	0,22
Mexico	0, 59	0, 54	9, 83	0, 84	1, 62	1, 08	0,49
The Netherla nds	5, 96	5, 79	3, 95	3, 81	2, 55	2, 12	-3,84
Ukraine		,5 3	,5 2	,2 2	,2 5	,4 1	5,41
USA	8, 97	1, 00	1, 95	3, 01	9, 69	8, 90	- 10,08

Source: [22]

Thus, in Ukraine there is a development of mechanisms of state regulation of the aerospace industry in order to ensure national security (through the development of infrastructure and information, space technology) and defense (through the development of the defense industry).

5. CONCLUSIONS

The study serves as a basis for the formation of the following important conclusions in the field of state regulation of the aerospace industry. During the twenty years of operation of the Aerospace industry in Ukraine, approaches to state regulation have changed in order to ensure national security. This includes. The liberalization of the industry and the strengthening of international co-

operation, exchange of experience and research in the field for the integration of space technology and information systems into the national security and defence system. Intensification of State regulations began in 2014. This was the strengthening of European integration, which provides for the development of mechanisms of state regulation in the following areas.

Institutional intensification of SSA and agencies, strengthening co-operation with other international space organizations, accountability. Financial expansion of funding from international organizations, state budget funds for financing projects by areas. Organizational development of various forms and instruments of State regulation. Programs of cooperation with foreign countries, exhibitions, forums, participation in international organizations, interaction with international companies, participation in international organizations, international projects, budget programs, public procurement.

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