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NEW EUROPEAN SPACE STRATEGY IN THE LIGHT OF MODERN CHALLENGES FOR ENSURING THE MOST EFFICIENT EXPLORATION AND USE OF OUTER SPACE

(Summary)

The geopolitical scene of space activities fluctuates as more and more actors are engaged in exploration and use of outer space in many revolutionary ways. These changes have to be reflected in future European space strategy in order to guarantee that Europe will maintain its position among space leaders. This paper analyzes the current Europe's space policy and confronts it with nowadays global challenges in the space sector. The ultimate aim of the article is to recommend a well-adjusted space strategy to assure effective and sustainable exploration and use of outer space for the benefit of all European States. Firstly, there is presented the coexistence of EU and ESA as two main conductors of Europe's space programmes and subsequently diverse motivators, needs and interests of their members in engagement in space-related activities are considered. Secondly, this paper argues that to be able to enhance European capabilities in space operations the European space policy has to focus on providing its autonomy in access and use of outer space. In particular, the paper highlights that to enable autonomy in various fields of space applications, first and foremost, an independent access to space has to be assured. The present paper also aims to extensively analyze the challenges and opportunities related to dynamic development of private space sector activities. It emphasizes the significance of symbiotic cooperation between public institutions and private companies with regard to mutual as well as the need for adequate regulatory framework backed by right policy in order to incentivize private investments. Current difficult questions related to establishment of up-to-date space regime, amendment or just clarification of regulations concerning procedures and decision-making process are addressed with suggestions for future elaboration. The paper concludes that it is a right time for Europe to build a bold and prospective space policy.

Keywords: European space policy; space law; European autonomy; ESA and EU; Private space sector

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1. Introduction

It has been more than 60 years since the first satellite was launched in the outer space, beginning the new chapter of civilization development in which humans' life will no longer be restricted to lands, waters, undergrounds and air space above their heads, and will start opening the gateway of the endless universe beaming with unimaginable possibilities. Since that time, by working together – which is essential due to extremely high cost, great risk and requirement of state-of-the-art technology to undertake space missions – people strive to increase its capability in order to be able to the fullest exploit potential hidden above the sky. Along with the end of the Cold War and formation of multipolar space world, one can observe an upsurge in world-wide international cooperation[1]. More and less powerful countries were eager to join their forces by bilateral and multigovernmental agreements or even by the establishment of supranational organizations.

This trend was especially characteristic for Europe where States weakened by devastating World Wars did not have sufficient funds to craft effective national space policies. Therefore, seeking cooperation with one another, they were keen to establish intergovernmental bodies to govern their objectives the most efficiently. Nowadays, the European landscape of space activities changes as number of countries involved in space activities increase and we are on the brink of space commercialization as more and more private companies undertake their own space ventures[2]. As the result, the number and scope of possible activities in outer space are still growing along with technological and scientific development. These changes have to find their echo in prospective European space policy for the years to come. To draw the most efficient path to European space future, understanding Europe's past and current space governance is of the essence.

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1 **N. Peter**, *The changing geopolitics of space activities*, Space Policy 2016/37, pp. 145–146.

2 **G. Genta**, *Private space exploration: A new way for starting a spacefaring society?*, Acta Astronautica 2014, p. 1.

2. European Space Governance – institutional coexistence in conducting European space strategy

2.1. European Space Agency

Regarding outer space activities, the willingness to cooperate resulted in establishment of two agencies: ELDO[3] (European Launch Development Organization) and ESRO[4] (European Space Research Organization) in 1960s, which laid the foundation of current European Space Agency[5] (ESA) created in 1975, which as of today, brings together 22 European Member States[6]. The competences attributed to ESA cover almost the complete spectrum of space-related activities what, on the same time does not prevent sovereign Member States from undertaking their own national space programmes[7]. Agency's purposes are to provide and promote cooperation among European states by elaborating and implementing a long-term European space and industrial strategy, recommending space objectives to the Member States and concerting their own policies. Broad objectives of ESA involve also establishment of activities and programmes in the space field. Thanks to its coordination of the European space programmes and the integration of national ones, ESA can ensure the most efficient implementation of European space ambitions[8]. This enhanced cooperation between European States has strengthen its capabilities and repeatedly profited them in the past in different areas like development of an operational launcher, satellite communication or earth observation. Under the shared auspices of ESA were also developed two European space flagship projects Galileo[9] for satellite navigation and Copernicus[10] for environmental and security monitoring.

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3 ELDO was established by the Convention for the Establishment of a European Organisation for the Development and Construction of Space Vehicle Launchers, London, done March 29, 1962, entered into force February 29, 1964, expired October 30, 1980.

4 ESRO was established by means of the Convention for the Establishment of a European Space Research Organisation, Paris, done June 14, 1962, entered into force March 20, 1964, expired October 30, 1980.

5 The Convention for the Establishment of a European Space Agency, Paris, (ESA Convention) done May 30, 1975, entered into force October 30, 1980; 1297 UNTS 161; UKTS 1981 No. 30; Cmnd. 8200; 14 ILM 864 (1975).

6 **ESA**, *New Member States*, 2017 http://m.esa.int/About_Us/Welcome_to_ESA/New_Member_States; access: 28.01.2018.

7 **F.G. von der Dunk**, *The European Union and the Outer Space Treaty: Will the Twain Ever Meet?*, Space, Cyber, and Telecommunications Law, Program Faculty Publications, 2017.

8 **ESA** Convention, Art. II.

9 **European Commission**, *Galileo*, 2018, http://ec.europa.eu/growth/sectors/space/galileo_en; acceess: 12.02.2018.

10 **ESA**, *Copernicus*, 2017, https://www.esa.int/Our_Activities/Observing_the_Earth/Copernicus/Overview3; access: 12.02.2018.

2.2. European Union

But ESA is not the only conductor of European space policy. The other one is the European Union (EU) by the European Commission (EC). Established in 1993 by Maastricht Treaty[11], European Union composed today of 28 Member States[12] holds the strategic position on international scene representing European political and economic interests. The European Commission recognizing the increasing value of space sector for the European policy and economy, supervise the comprehensive development of joint space-related activities and uniformity of Member States' space programmes.

The current source of EU competence regarding space activities can be find in the Treaty of Lisbon[13] which came in force in 2009. By restricting the extent of EU's capability to establish the European space programme, the 'space competence' is the expression of 'shared competences' concept. It means that "the Union and the Member States may legislate and adopt legally binding acts in that area. The Member States shall exercise their competence to the extent that the Union has not exercised its competence. The Member States shall exercise their competence again to the extent that the Union has decided to cease exercising its competence"[14]. As according to the art 4(3) "the exercise of that competence [by the Union] shall not result in Member States being prevented from exercising theirs"[15], therefore, some argues that more accurate definition of this relation would be a 'parallel competence' as it leaves Member States authority to implement their own domestic legislation in the realm[16]. And indeed, one can see consequences of such EU's competences limitation in practice by the example that while seven out of 28 EU Member States have national space legislations regarding a licensing regime of private space activities, the possibility for the Union to adopt a comprehensive EU law in this particular context is seriously limited[17].

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[11] The Treaty on European Union, Maastricht, done 7 February 1992, entered into force 1 November 1993, 31 ILM 247 (1992); OJ C 191/1 (1992).

[12] **European Union**, *Countries*, 2017, https://europa.eu/european-union/about-eu/countries_en; access: 12.02.2018.

[13] Treaty of Lisbon amending the Treaty on European Union and the Treaty establishing the European Community, Lisbon, done December 13, 2007, entered into force December 1, 2009; OJ C 306/1 (2007).

[14] Treaty on the Functioning of the European Union (Consolidated Version), Official Journal of the European Union, C 326/52, 26.10.2012, Art. 2(2).

[15] Treaty on the Functioning of the European Union (Consolidated Version)…, Art 4 (3).

[16] **F. von der Dunk**, **F. Tronchetti** (eds.), *The Handbook on Space Law*, Edward Elgar, Cheltenham 2015, p. 257.

[17] **F. von der Dunk**, *The European Union and the Outer Space Treaty: Will the Twain Ever Meet?*, Space, Cyber, and Telecommunications Law, Program Faculty Publications, 2017, p. 82.

2.3. The importance of cooperation

The coexistence in the field of outer space activities of the European Space Agency and the European Commission presents a challenge for elaboration of consistent and holistic space policy for the whole European community. The purposes staying behind their establishment and their main features differ. The European Union enjoys great legislative machinery and political influence possessing superior power in this realm to ESA which is more equipped with technical and operational expertise. Nevertheless in practice, competences and tasks of the respective institutions are often overlapping and far from clear delineation. Being autonomous and independent from each other, none of them can impose its vision and no hierarchy of their positions and roles in relation to conduct European outer space activities exists[18].

Notwithstanding this, recognizing the importance of working together to reach common objectives, EU and ESA reinforces their cooperation in joint programmes as Galileo or Copernicus[19]. The legal basis for this cooperation is provided by the Framework Agreement[20] (2003) and since then, their shared goals for the European future in space led to several other mutual commitments. In 2007 the 'European Space Policy'[21] adopted by the 'Space Council' of ESA and EU ministers seeks to increase coordination of their programmes and to organize their roles relating to outer space activities. More recently in December 2016 ESA and EC signed a Joint EU/ESA Statement[22] listing a number of common goals and emphasizing their intention to reinforce further cooperation.

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[18] **F. von der Dunk**, *Towards one captain on the European spaceship – why the EU should join ESA*, Space Policy 2003/19, p. 83.

[19] See further about Galileo and Copernicus as well as other EU-ESA cooperation: **S. Hobe**, **O. Heinrich**, **I. Kerner**, **B. Schmidt-Tedd**, *Ten Years of Cooperation between ESA and EU: Current Issues*, ZLW 58., Jg. 1, 2009, pp. 49–73.

[20] Framework Agreement between the European Community and the European Space Agency, Brussels, done November 25, 2003, entered into force May 28, 2004; OJ L 261/64 (2004).

[21] Resolution on the European Space Policy; ESA Director General's Proposal for the European Space Policy, ESA BR-269 (2007).

[22] **ESA**, *Joint Statement on shared vision and goals for the future of Europe in space by the EU and ESA*, 2016, http://www.esa.int/About_Us/Welcome_to_ESA/Joint_statement_on_shared_vision_and_goals_for_the_future_of_Europe_in_space_by_the_EU_and_ESA#; access: 30.01.2018.

2.4. National space policies of European States

Moreover, it should be remembered, that these are the sovereign European countries which constitute and form both institutions and it is eventually up to them how the future of Europe will look like. There can be seen two aspects of this constatation. Firstly, as the Member States lead the functioning of ESA and EU they must ensure that the potential conflicts of interests and competences will be minimalized. Particularly, in view of the fact that among 28 EU Member States and 22 ESA members, 20 belongs to both organizations, a symbiotic cooperation in a leadership of the European space policy has to be seen by the European States as crucial to assure proper development of their space sectors.

Secondly, despite being the Member States of one (or even both) of these organizations, European nations remain independent – as it was argued before – and they are able to perform their own national space policies outside the framework of institutions' activities. In consequence, one cannot lose sight of the fact, that each of them has its own particular needs and priorities depending on their motivations and rationales for public engagement in space. They depend on the financial capabilities or are the consequence of geopolitical, economical or geographical environment. It results in many differences among their space strategies. As science and exploration are valuable for all States, smaller ones are generally less interested in areas of energy and environment, which are the interests of richer ones. Out of many technological domains contributed by space activities and economical motivators, the most common ones are the boost of industrial competitiveness and foster of international cooperation[23]. But the governance of their space programmes differs from the smaller States where space-related activities are usually assigned to respective ministries, responsibility of which suits best national space goals, to space-faring nations which establish space agencies for conducting their various space operations. The European countries also differ from the point of view of strategy and policy formation as typically the bigger ones have them well-established and dedicated, while in the case of the smaller States, they are integrated in a broader innovation strategy, or even some of them do not have their space objectives established in any public document or accessible publication[24].

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[23] **D. Sagath**, **A. Papadimitriou**, **M. Adriaensen**, **Ch. Giannopapa**, *Space strategy and governance of ESA small member states*, Acta Astronautica 2018, pp. 117–118.

[24] **D. Sagath**, **A. Papadimitriou**, **M. Adriaensen**, **Ch. Giannopapa**, *Priorities in national space strategies and governance of the member states of the European Space Agency*, Acta Astronautica 2015, pp. 360–365.

Understanding this diversity of European States interests and needs in engagement in space-related activities is crucial for building successful and satisfactory common European space strategy for all Member States of ESA and EU.

3. The features of European space market

In order to craft the most efficient European space policy, the uniqueness of Europe's landscape of space-related operations should be emphasized. Europe is one of the leading actors in the field of outer space activities. Its space industry maintaining a world class technological level is strong and competitive. Europe's space programmes focuses on fostering new service, enhances European leadership and creates business opportunities employing over 230.000 people[25].

However, Europe lacks a continuous public demand on significant level in space services which usually constitutes a basis in space-faring nations allowing stabilization and fostering competitiveness[26]. European institutional space investments are about three times lower than in the USA and four times lower than in Russia. Similar weakness is visible in R&D sector, budget on which represents 10% of sales turnover in Europe, meanwhile in USA it is 25%. European space domestic market is significantly smaller than these of other space powers. There could be also noted structural weaknesses in European space sector as military and security are much more limited than in other space-faring nations.

4. The new European space strategy

Taking into consideration above-mentioned circumstances, to be able to develop space industry the most efficiently, enhance European capabilities in space operations and guarantee Europe to maintain its position among worlds space leaders, the European space policy should stress issues discussed below.

Europe's space strategy has to underline the importance of maintaining European political autonomy which is a precondition for strategic independence, understood as "the capacity to take strategic decisions and to execute them so as

[25] **European Commission**, *EU Space Policy*, Factsheet, pp. 1–2.

[26] **ASD-EUROSPACE The Space Group in ASD**, *A space strategy for Europe, Contribution of the European space industry*, Position Paper 2016, pp. 3–6.

safeguard a number of vital interests"[27]. It is essential for strengthening Europe's sovereignty and wealth as well as protection of European States interests. Besides, advanced independent development affects reliability of Europe as an important and strategic partner for other space-faring nations.

To enable autonomy in various fields of space applications, first and foremost, an independent access to space has to be assured. For that purpose Arianespace, a multinational company with its headquarters in France was established in 1980. It was formed on the basis of successful development of operational launchers by ESA and currently is supported by almost half of ESA Member States[28]. However today, Europe's well-established position as a leader in launch services is endangered. As new private American actors (as SpaceX or Blue Origin) and nationals ones as China or India emerge, the launch market become more and more sophisticated and competitive. With new technology used in next generation of rockets allowing for reduce of the costs of launch, it is much harder to win clients over[29].

And indeed, insufficient deployment of new technology in Arianespace future launcher can seriously threaten viability of the company and subsequently whole European independent access to space[30]. As the concept of reusability is being on the course to revolutionize space launches as it allows save up to 30% of the launch cost thanks to recovery of parts of a rocket (as in the case of SpaceX, which brings back on the Earth the whole first stage – engines and tanks – which represents around 70% of a rocket costs) and increase frequency of launches[31], Ariane 6 will be fully expendable which could affect its competitiveness. To prevent it from happen, two reusable engines are currently develop in Europe – Prometheus which would be used in Ariane 6 and even more advanced Adeline[32].

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[27] **J. Wouters**, **R. Hansen**, *Strategic Autonomy in EU Space Policy: A Conceptual and Practical Exploration*, in: **C. Al-Ekabi** (ed.), *European Autonomy in space*, Springer International Publishing Switzerland, 2015, p. 52.

[28] **Arianespace**, *Company Profile*, 2017, http://www.arianespace.com/company-profile/; access: 20.01.2018.

[29] **D.J. Salt**, *Reusable air-launch and the space access paradigm*, ROOM The Space Journal 2017/3 (13), pp. 31–32.

[30] **A. Sauzay**, *Espace: l'Europe contre-attaque?*, Note, Institute Montaigne, Decembre, 2017, pp. 79–82.

[31] **Quora**, *How Much Does SpaceX Save By Reusing A Falcon Rocket?*, 2017, https://www.forbes.com/sites/quora/2017/07/21/how-much-does-spacex-save-by-reusing-a-falcon-rocket/#47829a79724d; access: 20.01.2018.

[32] **V. Guillermard**, *Fusee reutilisable: Ariane prepare sa contre-attaque*, Le Figaro, 15 Decembre 2017, N. 22 814, p. 27.

In that place, it is crucial to underline the significance of enhancing promotion of and support for commercial space launch services which will boost innovation development and in consequence will reduce costs. Instead of the US launch market, there still are not many private companies willing to undertake launch operations in Europe what is on the one hand a result of much smaller market and consequently fewer potential clients but on the other hand also because of lack of proper policy towards such investments. ESA as well as EU should firstly concentrate on making contracts with private companies for developing required technology or delivering specific services. It should happen with financial contribution from both sides and under necessary level of supervision of public institutions in order to ensure anticipated results. Moreover, when possible, the governments should purchase already existing private services instead of building their own systems for public space missions.

Along with ensured autonomous access to space, Europe can benefit from independent space applications. In three the most important sectors of space application a deliberated and prospective strategy is already carried out and should further developed in years to come[33]. The first of such is Earth observation which provides capability to meet the challenges as disaster management or monitoring environmental pollution. It also helps in strengthen safety and security in increasing menace from terrorism and modern types of warfare, as well as monitoring natural changes and migrations. To not to be obliged to rely on other nations systems in such strategic matters EU and ESA combines their efforts to establish the programme of Global Monitoring for Environment and Security (GMES, currently Copernicus) which aims at achieving autonomous, high quality Earth observation capacity. Another sector of space application is satellite navigation. It is dominated by US and Russian systems, but lately also China, Japan and India invest in their own regional satellite navigation services. In Europe, Galileo programme meets the need for intendent system under civil control perfectly. The constellation of 30 satellites is planned to be completed by 2020[34]. It will provide precise positioning signals and will help Europe manage road, earth and sea traffic, as well as it will enable for Europe to cooperate on a new level, for example connecting Galileo and USA's GPS

[33] **R. Densing**, **N. Reinke**, *The Need for European Independence in Space Applications*, in: **C. Al-Ekabi** (ed.), *European Autonomy in space*, Springer International Publishing Switzerland, 2015, pp. 127–129.

[34] **European Commission**, *Space Strategy for Europe*, Communication from the Commission to the European Parlament…, 2016, p. 8.

system. In the field of satellite communication[35], the oldest and best-known area of space application, indispensable for modern world, with great commercial market, Europe cannot stay behind. Being aware of the strategic values that it poses, ESA is developing European Data Relay Satellite (ESRS) system which will provide fast and reliable telecommunications network ensuring European nations independence in transforming their own data.

To properly protect its space assets Europe has to be able to monitor space weather and gather real-time, precise information about human made or natural near-Earth space objects orbiting in outer space. Current European Space Situational Awareness (SSA) programme is undertaken by ESA as an optional with financial participation of 19 Member States[36]. With international cooperation, Europe has to develop and operate system which will ensure space objects security and will allow Europe to be a partner, instead of a customer for other space-faring nations[37]. This issue is also vital in the context of still increasing amount of space debris. European nations through their actions in ESA and EU should be foreground actors on the international arena in ensuring robust and comprehensive regulations concerning space debris mitigation[38]. Closely related to the issue of SSA is space traffic management. In the lack of a competent intergovernmental specialized organization or agency, on the cusp of space commercialization and enhanced use of outer space, the 'rules of the road' applicable to outer space operations are necessary and European States should take its unified stand also in that case[39].

It should be emphasized here, that Europe does not need independence in every space-related field. In science and technology, or deep space explorations and manned spaceflights the cooperation and interdependence is the most desirable way by which they should be undertaken[40]. But even then, it is crucial

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35 **R. Densing**, **N. Reinke**, *The Need for European Independence*, pp. 131–132.

36 **ESA**, *Space Situational Awarness*, 2017, https://www.esa.int/Our_Activities/Operations/Space_Situational_Awareness/SSA_Programme_overview; access: 5.02.2018.

37 **S.A. Kaiser**, *Legal and policy aspects of space situational awareness*, Space Policy 2015, p. 6.

38 See further about legal aspects of space debris and their mitigation: **T.L. Masson-Zwaan**, *Legal aspects of space debris*, in: **C. Bonnal**, **D.S. McKnight** (eds.), *IAA Situation Report on Space Debris – 2016*, International Academy of Astronautics, Paris 2017, pp. 139–147.

39 **S.K. Hunter**, *Space Traffic Management Concepts Leveraging Existing Frameworks*, Space Traffic Management Conference, Emerging Dynamics, 2016.

40 **C. Simpson**, **J.D. Woerner**, *Exploration and cooperation at the heart of European space vision*, ROOM The Space Journal 2016/1 (7), pp. 23–25.

to guarantee European scientists' state-of-the-art tools and systems to enable them to be a par with the rest of international colleagues.

As was noted above, a weak public demand of Europe's nations leads European market to a unique situation. The European space industry – unlike other space powers – highly relies on the commercial business. As many as 64% of the European space industrial output is devoted to commercial markets, leaving only 36% to local institutional activities. In USA, contrary, this number are 60 to 40% for advantage of institutional market[41]. This close connection with private sector emphasizes the significance of cooperation between public and private actors within the framework of European space strategy.

4.1. New policy towards private space sector

The privatization and commercialization of outer space is on its way and we are on the brink of economic boom in space-related activities. Private companies do not anymore limit themselves to traditional sectors as remote sensing or direct broadcasting. Their ideas are revolutionary and rich entrepreneurs which stay behind them are willing to invest lots of money in bold endeavors like space tourism, space hotels or asteroid mining[42]. A potential of outer space for commercial market is huge and even though it is still uncertain and risky, the number of new ventures increase.

The advantages of this trend are plural. The fundamental difference which benefits private companies over public agencies is a one of policy nature. While public agencies are directly dependent on state's administration with its changing powers, influences and lobbies, the national policies can change every few years after each election and with it a strategy as well as budget on space programmes. In such environment, keeping permanent priorities can be very difficult. Whilst, private investors, based on market situation and commercial demand develop their strategy independently being in a better position to maintain long term engagements and stable goals[43].

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41 **ASD-EUROSPACE The Space Group in ASD**, *A space strategy for Europe*…, pp. 3–6.

42 See further about recently especially electrifying issue of space mining including its legal aspect: **T. Masson-Zwaan**, **N. Palkovitz,** *Regulation of space resources: Meeting the needs of States and private parties*, QIL, Zoom-in 35, 2017, pp. 5–18; See further about space tourism and its legal aspect: **S. Hobe**, *Legal Aspects of Space Tourism*, Nebraska Law Review 2007/86:439, pp. 439–458.

43 **G. Genta**, *Private space exploration*…, p. 2.

However, decision to invest in space business is not easy as the exceptional risk accompanying space endeavors goes hand in hand with necessity of unprecedentedly high investments. Eventually, when somebody decide to take up a task, there are multiple challenges ahead concerning remarkably sophisticated science and technology, designing, building and operating state-of-the-art space machines. But potential risk and uncertainty does not end there. Success in achieving envisaged goals, or even in accessing market or raising investment capital profoundly relies on political and regulatory decisions. Very often, it is not a technological or financial complication what is stopping entrepreneurs from undertaking a determined venture but a lack of certainty and assurance that such investment will be duly, legally protected[44].

The current and future model of handling space-related activities by European States directly translate to opportunities for private investors. As prof. Jakhu emphasizes, facilitating development of private space companies constitute a great challenge for governments[45]. The way they perceive private entities and the role they assign them as well as the mechanisms they establish to work together and to award contracts define further development of European private space sector. Public programmes constitute a major part of consumption of space services and even in a such unique environment as mentioned before European space market represents with high reliance on non-public activities, it rests decisive for governments to on the one hand enable the flourish of private ventures by preparing reliable, stable political and legal basis guarantying protection for private investments and on the other hand to become a principal customer of all kinds of private space services. To ensure the latter, close work and transparent communication is essential. By understanding the needs and goals of its partners, both sectors can benefit from a symbiotic relationship.

What happens on the scene of space activities already do not go unnoticed by European actors. ESA with its 'Space 4.0' strategy[46] acknowledges the evolution of space sector. It emphasizes the importance of interaction between governments, private sector, society and politics to maintain competitiveness of its programmes. 'Space 4.0' includes also full integration of European economy

[44] **I. Christensen**, *Building confidence and reducing risk in space resources policy*, ROOM The Space Journal, 2016/1 (7), pp. 38–39.

[45] **R. Jakhu**, **J. Logsdon**, **J. Pelton**, *Space Policy, Law and Security*, in: **J. Pelton**, **A. Bukley** (eds.), *The Farthest Shore: A 21st Century Guide to Space*, International Space University, 2009, p. 208.

[46] **ESA**, *What is space 4.0*, 2016, http://m.esa.int/About_Us/Ministerial_Council_2016/What_is_space_4.0; access: 12.03.2018.

and industry (analogously baptized as 'Industry 4.0'). Moreover, ESA expresses its interest in a close collaboration with private sector in the context of space exploration plans. By the 'call for ideas' initiative[47] it offers opportunity for private companies to become a strategic partner with the realization of European exploration ideas for mutual benefits.

Similarly, on the national level one can also find strategies adjusted to the changed space scenery. For example, CNES (French national space agency) introduce new methods in respect of expanding global competition and commercialization of outer space activities[48]. It still focuses on innovation and development of space systems but its approach has changed from the 'top down' concept to the 'bottom-up' policy in which potential users are firstly asked about their needs and as a consequence of their answers, the development of adequate systems starts.

With no underemphasizing abovementioned adjustments, there is still a need for a further, robust, unified and preferably European-level actions in order to fully take advantage of emerging private space sector.

Therefore, to enable a rise of private initiatives European governments have to review their space regime and establish, amend or just clarify regulations applicable to space-related activities. While being aware of a possible threat which possess insufficient regulation, public law-makers have to also keep in mind that light-touch approach is crucial to enable expansion of private ventures. Regulatory policies has to be implemented progressively with the realization that too early action carries certain risks and some level of flexibility is necessary in order to achieve the rollout of private investments.

Procedures of licensing, payload reviews, wide variety of controls and inspections carried out prior to launch will have to be reexamined and modernized to be able to manage increased number of operations. Application and decision-making processes should be transparent, consistent and equal across those willing to undertake space operations. On the same time, European legislator should keep off vague and ambiguous provisions trying to regulate a broad spectrum of activities in one fell swoop and instead establish particular regimes for specific cases when required.

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47 **ESA**, *Call for Ideas Space exploration as a driver for growth and competitiveness*, 2015, http://m.esa.int/About_Us/Business_with_ESA/Business_Opportunities/Call_for_ideas_Space_exploration_as_a_driver_for_growth_and_competitiveness; access: 12.02.2018.

48 **J.Y. Le Gall**, *Astronautics Our space future lies in innovation*, ROOM The Space Journal 2017/4 (14), pp. 45–46.

An active law-making role is vital not only from the point of view of benefits which it brings to internal market but it is also highly relevant for the European States from the perspective of their international position. Even though the equal access, use and exploration of outer space are the principal guaranteed by the space law regime[49], space powers have a greater impact on a development of space law due to their practices as well as interpretations of international treaties and subsequent establishment of corresponding domestic space law[50]. They shape their regulations around their space policies and industries in the way to be the most efficient for their own interest instead of elaborating them through multilateral negotiations. This regulatory shift from the international to national level in law-making could result in the development of future space law in favor of some States which are more active in standards setting[51]. From the European perspective it is key to take a clear and unified position in this matter in order to regulate the issues for commercial worldwide space market and to assure an adequate protection of space and on-ground environment. At this point, it is also vital to emphasize that it is essential for emerging European space nations to be active in legislation domain also in their own countries[52]. As mentioned above, it matters not only because of the fact that a stable and reliable national law is the basis for a development of private companies in any given country, but also from the point of view of their international position and interest in space activities. If emerging space nations want to play a significant role on the international level and benefit from the principle of equality in space endeavors, they have to adopt similar strategies and legal regimes to these of space-faring nations.

5. Conclusion

Even though the well-known Space Race finished along with the end of the Cold War, nowadays one can witness the next chapter of it but with different actors, attitudes, activities or even aims. The New Space Race is characterized first

[49] **F. Tronchetti**, *Fundamentals of Space Law and Policy*, Springer, New York 2013, p. 8.

[50] **S. Pace**, *Space cooperation among order-building powers*, Space Policy, May 2016/36, pp. 3–4.

[51] **G.M. Danilenko**, *International law-making for outer space*, Space Policy 2016, p. 181; See further about space law-making process and future of space law: **R. Jakhu**, *Global public interest in outer space*, Journal of Space Law 2006/32, pp. 89–107.

[52] **J.A. Dennerley**, *Emerging space nations and the development of international regulatory regimes*, Space Policy 2016, p. 4.

and foremost by an emergence of private space sector increasing of which role changes the whole scene of space endeavors[53]. The potential benefit and risk which this revolution brings have to be taken into consideration by the European players while drafting their new space strategies. The European policy-makers also have to emphasize the significance of remaining autonomous in access to and operations in outer space. Wise and forward-looking decisions can provide Europe with cheap launch services, large space market and new investors guaranteeing competitiveness of European space industry while remaining a strategic partner for other space-faring nations.

It is a right time for building a bold, prospective European space policy. Even though private space market is not free from unpredictability and challenges and even further new and complex problems would occur in the future, it is worth to seize this opportunity to not to drop off from this New Space Race.

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NOWA EUROPEJSKA STRATEGIA KOSMICZNA W DOBIE WSPÓŁCZESNYCH WYZWAŃ W CELU ZAPEWNIENIA NAJEFEKTYWNIEJSZEJ EKSPLORACJI I UŻYWANIA PRZESTRZENI KOSMICZNEJ

(Streszczenie)

Geopolityczna scena aktywności kosmicznych podlega znaczącym zmianom wraz ze wzrostem liczby podmiotów zaangażowanych w coraz to bardziej rewolucyjne przedsięwzięcia w przestrzeni kosmicznej. Ta sytuacja musi znaleźć swoje odzwierciedlenie w przyszłej europejskiej strategii kosmicznej, aby zagwarantować Europie utrzymanie miejsca wśród światowych potęg kosmicznych. Artykuł ten analizuje obecną europejską politykę kosmiczną i konfrontuje ją ze

współczesnymi wyzwaniami w sektorze kosmicznym. Celem artykułu jest zaproponowanie koniecznych zmian w owej polityce, które pozwolą uczynić ją najefektywniejszą w zakresie eksploracji i używania przestrzeni kosmicznej dla wszystkich państw europejskich, zapewniając przy tym zrównoważony ich rozwój. W pierwszym rzędzie artykuł prezentuje koegzystencję EAK i UE jako dwóch, głównych dyrygentów europejskich programów kosmicznych, a następnie rozważone zostają różnorodne potrzeby i interesy ich państw członkowskich w zakresie działalności kosmicznych. W dalszej części przedstawiona jest rola możliwości niezależnego korzystania z przestrzeni kosmicznej dla rozwoju europejskich misji, ze szczególnym uwzględnieniem konieczności zapewnienia autonomicznego do niej dostępu. Celem artykułu jest również analiza sytuacji w dynamicznie rozwijającym się prywatnym sektorze kosmicznym i szansa, jaka jest tego wynikiem dla europejskiego przemysłu kosmicznego. Podkreślone jest przy tym znaczenie symbiotycznej współpracy publiczno-prywatnej z uwzględnieniem obopólnych korzyści z niej płynących oraz potrzeba stworzenia odpowiedniego reżimu prawnego i stojącej za nim konsekwentnej polityki. Artykuł ten konkluduje, że jest to odpowiedni czas na przyjęcie odważnej i przyszłościowej europejskiej strategii kosmicznej.

Słowa kluczowe: europejska polityka kosmiczna; prawo kosmiczne; europejska autonomia; EAK i UE; prywatny sektor kosmiczny