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THE TECHNOLOGICAL AND ENVIRONMENTAL AFFAIRS COMMITTEE

REPORT*
"Space Technologies in the BSEC Member States: National Policies and Developments"

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I INTRODUCTION

1.The Universe and its greatest power and mystery have been inspiring people and generated a passion for space sciences. Unquenchable curiosity and thirst for knowledge and desire to unveil the secrets of the space and to dominate it led to the necessity to conduct observations, explore the outer space, and create space technology and systems. The technological development allowed sending humans into the space that substantially enlarged the human knowledge about the Universe. Launching of satellites ensure functioning of many important land-based technologies related to navigation, communication, television, the Internet, meteorology, aviation, maritime and land transport, agriculture, etc. Satellite images allow not only to monitor current changes on the planet, but also to predict many processes occurring on Earth. Space research is used in various areas of everyday life. Scientific space experiments help fight climate change, and equipment designed for astronauts and cosmonauts are being adapted for the use in medicine and sports.

2. Satellites and space developments play an important role in ensuring the national security of states. For several countries, space activities are acquiring a greater strategic domain in the field of national defence, public safety, and security. The present level of space technological development allows to be ready for possible threats to security, provided that the international community takes timely and coordinated measures to prevent and minimize possible danger. The improvement of space programmes contributes to the transformation of space activities into a common cause of the entire world community.

3. The space science and technology are also applied to achieve the Sustainable Development Goals (SDGs), including food security, natural disaster and humanitarian crisis reduction, natural resource monitoring, poverty reduction, etc. In recent years, innovations in space technologies have opened the access to geospatial data, information products and services. One of the key drivers of the technological progress in this area, is the emergence of private sector actors in space technology and the adoption of innovative approaches, opening up opportunities for new configurations of public-private partnerships and cooperation in science and technology. The partnerships between the public and private sectors contribute to the expansion of cooperation at regional and international levels, through the conclusion of bilateral and multilateral agreements ensuring access to satellite capacity.

4. Taking into consideration the relevance of the topic and the importance of strengthening the cooperation in the sphere of space technologies, in the BSEC Member States, it was decided that the Second Meeting of the PABSEC Technological and Environmental Affairs Committee, to be held on 11 April 2023, will discuss “Space Technologies in the BSEC Member States: National Policies and Developments”.

5. The progress in the development and implementation of a national policy in space and geospatial applications depends largely on the socio-economic and political situation in a country. Governments may have different motivations for participating in space-related activities and they are facing various limitations. Countries can also consider space programs as part of a broader economic development and of science and technology initiatives. The countries also invest in infrastructure and capacity building programmes to support research and development, education and entrepreneurship, in space-related areas.

6. The present Report uses the information from the national delegations of the Republic of Azerbaijan, the Hellenic Republic, the Republic of Moldova, Romania, the Russian Federation, the Republic of Türkiye and Ukraine. It also uses the research material, reports of relevant international organizations as well as the relevant information from various Internet sources.

II SPACE TECHNOLOGY AND ECONOMY - NATIONAL POLICIES, DEVELOPMENT AND TRENDS

7. At present, space activities in the world, their scientific and production base have become a part of the global economy, subject to development trends. The space sector of the economy undergoes dynamic and stable progress. Global space activities imply satellite communications and broadcasting services, the system for remote sensing of the Earth, services of space navigation systems, production of space vehicles, production and operation of ground support for space systems. At the same time, many production and service sectors depend on the development of space activities. To this end, every year space activities attract the attention of an increasing number, not only of states and their alliances, but also of big transnational corporations. Increasing the number of space market participants triggers the growth of financial resources in this sector.

8. The strategic directions for the activities of states envisage analysis of global trends in the development of space activities and the tasks for creating and developing the space industry in a country. In national policy formation, space economy and innovative technologies are one of the most effective engines for economic growth, helping to achieve and strengthen national competitiveness, by also promoting opportunities coming from other industries. The countries are increasingly investing their resources in space related programs. Several states with emerging space capabilities are pondering the forming of the basis for the establishment of essential space technologies. However, national legal regulations are created very dynamically in different parts of the world and are far from being unified. They reflect the specifics of domestic policy and the interconnectedness of the national space policy with policies regarding science, research, defence, innovation, etc.

9. Space capabilities provide unique advantages for security and defence purposes and national decision-making. In addition, space systems are of vital importance for the regular monitoring of the implementation of strategic plans and military actions, thus enabling the government bodies to form a global vision in a timely manner and quickly respond to global challenges. Countries are developing plans for the further development of their space programs within the framework of national priorities in the field of strengthening security and implementing breakthrough scientific, technological, and socio-economic development.

10. Today, many countries have established their space programmes to facilitate space exploration and research, the deployment of artificial satellites and the development of space resources. Along with high-profile space programs, such as the National Aeronautics and Space Administration-NASA(USA), the Russian Federal Space Agency-ROSCOSMOS, China National Space Administration-CNSA, and the multinational European Space Agency (ESA[1]), there are agencies in countries that are technologically advanced. More countries create space agencies and several groups of states have pooled their resources to establish regional agencies. Today, it seems virtually impossible to deal with weather forecasting, satellite TV, Internet and communications, without the use of space systems. These technologies provide the possibility to use the communications systems in real time from practically any location. The information provided by space technologies helps to improve the management of the Earth's natural resources and the environment, to monitor the Earth's climate system and support decision- making regarding climate change[2]. Satellite data can also help monitor and prevent environmental damage as well as address various issues, such as water management, air pollution, forest conservation, etc.

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[1] Greece and Romania are full members of the ESA, while Bulgaria has a cooperation agreement with the Organization.
[2] According to the World Meteorological Organization, space data allow to observe no less than 50 % of the 56 vital climate variables, necessary to understand climate change.

11. There is a growing public and private investment in space programmes. Even with great private sector participation, the expenditure of governments on space programs worldwide has increased in the past years and there is a trend likely to also continue in the forthcoming period. Despite the Covid-19 pandemic, in 2021 the governmental spending on space programs globally amounted to 92.4 billion USD, which represented an increase of around 8 percent in comparison to 2020. According to the Organization for Economic Cooperation and Development (OECD) findings, governments still fund the largest proportion of space-related innovations in many space activities, in particular the traditional activities, such as space science, space manufacturing and launch. Governments are also increasingly partnering with the private sector, for the joint development of space products and services. In 2020, combined gross domestic product (GDP) spending of the G20 countries, related to space budgets, amounted to 0.05 percent. The United States and the Russian Federation led in space spending with investing more than 0.2 percent of their GDP.

12. New times bring new developments in the space landscape. At the initial stages of exploration and use of outer space, space programs were financed from the state budget. Today, the new space age sees the emergence and multiplication of new commercial actors in the global space sector. Commercial space activities are growing rapidly, and the share of private investment is increasing. Commercial space activities cover both the development and production of space vehicles and space platforms, as well as land-based infrastructure, including the control stations for spacecraft. Also, private astronautics develops intensively. The commercialization of space activities is generated by the enhancement of new major directions in space exploration and by the emergence of new players in the global space market. The joint study by the European Commission and the European Investment Bank of 2019, states that the commercial space activities make up approximately three quarters of the overall space economy, while government investments amount to approximately one quarter.

13. The launch of the first artificial satellite Sputnik 1, in 1957 in the USSR, announced the start of the new space era and the intensive exploration and research of the outer space. In the following decades, the space activities began to progressively expand and to make a significant contribution to the innovative development of scientific industries and to the effective solution of many socio-economic tasks. Space activity opened new opportunities and it is an inexhaustible and constantly developing source of innovative technologies, in virtually all the areas of modern life. Over time, new advances have enhanced space exploration, including the launch of the In Sight lander to Mars, in 2018 and the landing of the Rover Perseverance, in 2021. Every year, the priorities of national and international space programs and projects are evaluated and revised, the methods for their implementation are improved, the regulatory framework for space activities is expanded, and the role of international cooperation in space exploration is significantly increased. Space ensures the efficient operation of the most important information communications of the global economy, as well as a high technology production and resource extraction.

14. The space industry is a competitive and booming industry, set to grow above the global GDP growth rates. The competition among countries in the field of space activities is shifting from commodity competition to the enhancement of national innovation systems, including education, fundamental and applied science. The global space economy grew on average, by 6.7 percent per year, between 2005 and 2017. The global space economy market in 2021, was estimated at 388.50 billion USD and is expected to reach 540.75 billion USD, by 2026. Moreover, according to the latest assessments, the space economy market is expected to grow at a compound annual growth rate of 6.84 percent, during the projected interval of 2022-2026. According to estimates from the Morgan Stanley investment bank, the economic potential of space commerce for businesses, could amount to one trillion USD, by 2040.

15. The dynamic development of the space economy sector is a prerequisite for boosting employment and creating more highly skilled jobs, which in turn requires high quality education and leads to creation of new jobs and professions. Thus, in 2017, the number of jobs in the global space sector was roughly estimated to be around 1 million.

16. As a result of the extensive advancement in space exploration, the emerging concept of space tourism has started to flourish, with various private companies involved. It is expected that the space tourism will be widely available in the decades to come. The prospect of space tourism is actively supported by billionaire Elon Musk's SpaceX, billionaire Richard Branson's Virgin Galactic and billionaire Jeff Bezos' Blue Origin.

17. The space is an important driver of innovation and entrepreneurship. Innovations needed for space exploration, have driven the enhancement and betterment in other space systems and services, resulting in higher performance and lower costs. These in turn, resulted in better services on Earth areas, such as materials, power generation and energy, recycling and waste management, advanced robotics, health and medicine, transportation, engineering, computing, and software. Recent data show that space ventures have attracted over 14.8 billion EUR in investment since 2000. Moreover, the space and its related technologies are also a highly attractive area for research and development, as well as for scientific exploration. In addition, many innovations of the past years begin to be used in the household. Many household items used in everyday life are a product of space technology, developed for space explorations. For example, wireless household and medical devices, innovative water filters, shatterproof lenses, infrared thermometers, treadmills, freeze-dried food, tomography, solar panels, prosthetics, orthopaedic foam, phone cameras, shoe cushioning, Teflon coating have become an integral part of everyday life.

18. The space science and technology play an important role in achieving the 2030 Agenda for Sustainable Development. The role of the Earth observation and of the global navigation satellite systems is recognized by the United Nations (UN), in supporting the achievement of the SDGs. A 2018 analysis done by the United Nations Office for Outer Space Affairs (UNOOSA), in cooperation with the European Global Navigation Satellite Systems Agency[3], specifies that almost 40 percent, or 65, out of 169 targets, that are supporting the 17 SDGs, are directly taking advantage from the use of geo-location and of the Earth observation satellites. Satellite observations are important for achieving the SDGs, especially related to the environment, agriculture and food sectors, public health field, etc.

III INTERNATIONAL AND REGIONAL FRAMEWORK AND EXPERIENCE

The United Nations framework

19. The UN has a long history of promoting greater international collaboration in outer space and the use of space technologies for sustainable development. The Committee on the Peaceful Uses of Outer Space was set up by the UN General Assembly, in 1959. With its Scientific and Technical and Legal Subcommittees and supported by the UNOOSA, the Committee has served as a unique platform to promote international cooperation in the peaceful uses of outer space. The Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies or the "Outer Space Treaty", of 1967, is the basic framework of international space law that sets the principles governing the space activities. There are four more UN treaties that constitute the legal framework: Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (1968); Convention on International Liability for Damage Caused by Space Objects (1972); Convention on Registration

[3] *It was reorganized as the European Union Agency for the Space Programme, in 2021.*

of Objects Launched into Outer Space (1976); Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (1984).

20. The "Space 2030" Agenda: space as a driver of sustainable development was adopted by the General Assembly, in Resolution 76/3, on 25 October 2021, as a new roadmap for advancing the use of space. The Agenda recognizes that space tools are highly relevant for the fulfilment of the global development agendas, in particular, the 2030 Agenda for Sustainable Development, the Sendai Framework for Disaster Risk Reduction 2015-2030 and the obligations by the States parties, to the Paris Agreement. The Agenda sets the following objectives: (1) enhancement of space-derived economic benefits and strengthening the role of the space sector, as a major driver of sustainable development; (2) making use of the potential of space to solve everyday challenges and leverage space-related innovation to improve the quality of life; (3) improvement of access to space for all and ensuring that all countries can benefit socio-economically, from space science and the technology applications, thereby supporting the achievement of the SDGs; (4) building partnerships and strengthening international cooperation in the peaceful uses of outer space and in the global governance of outer space activities.

The International Space Station (ISS)

21. The ISS is one of the largest and most complex international scientific and technological endeavours ever undertaken, resulting from decades of research, that have led to the improvement of the existing technological solutions and the creation of new ones. The ISS is a partnership among five space agencies, namely, the NASA, the ROSCOSMOS, the ESA, the Canadian Space Agency (CSA) and the Japan Aerospace Exploration Agency (JAXA), for the joint development, operation, and utilization of a permanently inhabited space station in low Earth orbit. This multinational cooperative programme represents the greatest single structure which the humans ever put into space. The ISS has been continuously occupied since November 2000.

The European Union (EU) framework

22. The European space industry is one of the most competitive industries in the world, with an estimated value of 53-62 billion EUR and more than 231,000 employees. The latest space strategy for Europe was adopted by the European Commission, in 2016. The EU Regulation 2021/696 of 28 April 2021 sets up the European space programme for the 2021–2027 period, as well as the EU Agency for the Space Programme. The programme is to be implemented for the 2021-2027 multi-annual financial framework period, with the allocated budget of 14.8 billion EUR. It aims to: (1) ensure accuracy and high-quality of the space-related data, information and services; (2) maximize socio-economic benefits to enable growth and job creation and promote the broadest possible uptake and use of the data, information and services provided by the programme's components, both within and outside the EU; (3) enhance the safety and security of the EU and the EU Member States and reinforce EU autonomy regarding technology; (4) promote the EU's role as a global actor in the space sector, encourage international cooperation, reinforce EU space diplomacy; (5) enhance the safety, security and sustainability of all outer space activities relating to space objects and debris proliferation as well as the space environment.

23. The EU space programme consists of several major programmes and encompasses: (1) Galileo - EU´s own global navigation satellite system, providing improved positioning, navigation and timing services; (2) Copernicus – the advanced Earth Observation system; (3) European Geostationary Navigation Overlay Service (EGNOS) – a regional satellite navigation system that provides navigation services used *inter alia*, for air-traffic management, air navigation services and other transport systems; (4) Space Situational Awareness (SSA)- system related to the surveillance and tracking of space objects that orbit the Earth, parameters related to space weather

events and system of monitoring the near-Earth objects approaching the Earth; (5) Governmental Satellite Communications (GOVSATCOM)- a satellite communications service facilitating security-critical missions and operations and the management of critical infrastructures.

The Eurasian Economic Union (EAEU) framework

24. The Strategic Directions for Developing the Eurasian Economic Integration until 2025, approved by Decision No. 12 of the Supreme Eurasian Economic Council of 11 December 2020, stipulate, among other things, the building of a management system for joint cooperation projects and the development of high-performance sectors promotion, as well as the scientific and technological progress.

25. The interstate program "Integrated system of the EAEU Member States for the production and provision of space and geo-information products and services, based on national sources of Earth remote sensing data" was approved by the Decision of the Eurasian Intergovernmental Council, on 7 July 2020. The program is implemented during 2021-2025. The cost of implementing the inter-state program amounts to 29 billion RUB (app. 488 million EUR).

26. The EAEU is working on developing joint space programmes and space technology and considers possible the establishment of the Eurasian Space Agency.

The BSEC framework

27. Some of the Member States the BSEC Region have long been active in the field of space and have their space industry and systems, technology, infrastructure, national programmes, and respective structures. There are also the Member States with emerging capabilities in this sphere. Space sector is currently undergoing transformation on a global scale and the need arises to further develop the space technology in the BSEC Member States, as well as to facilitate collaboration across the space industry in the region. The application of advanced space technologies ensures strengthening of security and stability to the Wider Black Sea Region which is very important due to its strategic significance as one of the main suppliers of energy to the world market.

28. Information and communication technologies and science and technology are areas of cooperation within the Organization of the Black Sea Economic Cooperation (BSEC) framework; however, space sector cooperation has not been considered within the BSEC yet. At the same time, as the fields of scientific research, technological development, science, and technology, are major assets for the sustainable social and economic development and the BSEC Member States, regional cooperation in the field of space research and technologies could contribute to further the dynamic and sustainable economic growth and the prosperity for the peoples of the Wider Black Sea region.

IV NATIONAL SPACE POLICIES OF THE BSEC MEMBER STATES

29. In 2009, the implementation of modern space projects in ***the Republic of Azerbaijan*** was launched with the "State Program for Creation and Development of the Space Industry in the Republic of Azerbaijan" approved by the President of the Republic of Azerbaijan. "Azerkosmos" Open Joint Stock Company ("Azerkosmos" OJSC) was established by Decree No. 885 of the President of the Republic of Azerbaijan, dated 3 May 2010.

30. In 2013, "Azerspace-1" telecommunication satellite, in 2014 "Azersky" remote Earth observation satellite, and in 2018 "Azerspace-2" telecommunication satellite were sent to the orbit. The main goals of the satellite projects are to support the national security, to contribute to the socio-economic development, to expand commercial activities, to support the conduct of scientific

research and to raise the international image of the country, by participating in international space initiatives.

31. The Space Agency of the Republic of Azerbaijan (Azerkosmos) was established under the Ministry of Transport, Communications and High Technologies, by Decree No. 1326 of the President of the Republic of Azerbaijan, dated 27 April 2021. The transformation of "Azerkosmos" into the Space Agency, aims to bring more benefit from the rapid technological progress in the world and to improve the space activities management. The Space Agency participates in the formation and implementation of the state space policy, performing functions of national and public importance, in the field of regulation and control, launching, managing and operating the satellites for telecommunications, for Earth observation and other purposes.

32. A comprehensive legal, policy and strategy framework support and governs space activities in ***the Hellenic Republic***. The respective legal framework is based on the Law 4508/2017 (A'200) chapter A, articles 1-17 and Law 4727/2020 (A'184), Article 119. This Law 4508/2017 regulates licensing of space activities and establishes the National Register of Space Objects. The Law 4727/2020 lays down the national objectives in the domain of space: 1) strengthening the national security and defence through the exploitation and development of space infrastructure; 2) development of the national space industry; 3) exploitation of space data and the development of related applications and 4) support of research and innovation in the space field. The Digital Transformation Strategy 2020-2025, of December 2020, lays out specific activities that the government will undertake in the space domain.

33. Greece is looking for complementarity and synergy among national, European and ESA programmes. The activities within the European space programme (Copernicus, Galileo, EGNOS, SSA and GOVSATCOM), coupled with the participation in the work of the ESA, provide the basis for multi-purpose technology and applications development, in response to the national needs and the industrial capabilities. Greece cooperates with the ESA, through the EU Recovery and Resilience Fund, to launch the national small satellite program until 2026, with the objective to promote the national space industry and infrastructures for national purposes, in synergy with the European space programmes. Governmental satellite communications system "Gree Com" has been successfully functioning since 2019. In addition, Greece participates in the EU Programmes for research and innovation.

34. The country's space sector is relatively new, yet rapidly developing. In recent years space science has shown considerable growth with a significant number of public and private sector players, which demonstrates a significant research and industrial and commercial activities related to space technologies, applications, and services. In the following period, it is expected that the priority will be given to space technology research and development as well as to space applications and services. The newly formed, industry-led si-Cluster heads the country's advancement in space technologies, bringing together several industrial enterprises as well as university labs.

35. The Centre of Space Technologies of the Technical University of ***the Republic of Moldova*** (UTM) has been implementing several projects to take advantage of the benefits of space technologies and applications. Several projects were implemented in the initial phase (2009-2010), within which the foundations for the development of satellite subsystems were researched and laid, applying state-of-the-art technologies in the space field. In the second phase (2011-2014), the research for subsystems development and manufacturing deepened, the foundations of verification and testing equipment were laid and the functional prototype of the first satellite, named "Satelit R. Moldova", was completed. During the third phase (2015-2018), projects for the development

and strengthening of the land infrastructure for satellite communication were implemented. In the fourth phase (2018-2022), the CubeSAT class nanosatellites were designed, and a series of prototypes were developed within the Project on "Development and launch of the series of research nanosatellites from the International Space Station, their monitoring, and post-operation, and space technologies promotion".

36. The UTM also participated in the KiboCube Program competition, coordinated by UNOOSA and JAXA with the TUMnanoSAt (1U) satellite model. In 2019, UTM won the competition. At the same time, the orbit launch module was created according to all JAXA and NASA standards and norms and placed in orbit on 12 August 2022. Furthermore, the subsystems of the next nanosatellite model in this range, TUMnanoSAT-2, 2U model, are under development within this project.

37. ***Romania*** has designated space as critical infrastructure. The Romanian Space Agency (ROSA) established in 1995 is the representative and coordinator of space activities in Romania. It is also the funding agency for space research, aeronautics and security. Moreover, ROSA is the national representative for the ESA, UN, EU, etc. and has bilateral agreements with many national space agencies. It develops its own research and development programmes and coordinates a network of competence centres such as: Centre of competence for small satellites; Centre of competence for launchers and spaceflight; Centre of competence for planetary sciences; Centre of competence for laser technology; Centre of competence for wireless intra-SATellite technologies; Centre of competence for navigation, guidance and flight control; Centre of competence for human spaceflight; Centre of competence for big data for space; Centre of competence for the Black Sea and Lower Danube; Centre of competence for atmospheric sciences and Centre of competence for agriculture space applications.

38. The membership in the European Space Agency provides Romanian organizations with access to all major programs implemented within ESA, which represents an important technology transfer and opening to the high-tech market.

39. The national research strategy in the field of security and space industry has three main directions of action: science and technology (space exploration, space infrastructures for scientific purposes, manned/robotic space exploration, artificial intelligence); services (space telecommunications, Earth observation, integrated applications); security (planetary defence, space weather, space traffic management, disaster management, border monitoring, air safety and security, maritime, land and rail traffic, cyber security and food security).

40. ***Russia*** has currently been implementing the Federal Space Program for the period 2016-2025. Its aim is to ensure implementation of the state policy in the field of space by forming and maintaining the group of orbital spacecraft in the interests of the socio-economic sphere, science and international cooperation, with the aim to protect the population and the territories from natural and man-made emergency situations, implement manned space programmes, set up launch vehicles and develop techniques, create scientific and technological reserve for prospective space complexes and systems.

41. By 2025, the State Corporation Roscosmos plans to increase the number of orbital communication and relay satellites up to 41 (from 32 satellites in 2015). The capabilities of satellite communication systems providing services of direct television broadcasting, high-resolution television broadcasting, broadband Internet access, data transmission, video conferencing, institutional and corporate communication networks will increase by more than 2,5 times. The deployment of communication and broadcasting satellites in highly elliptical orbits contribute to solving the task of telecommunications support for the Arctic Region. Moreover, Russia

consistently increases the number of satellites and plans to launch 11 communication satellites and 31 Earth Remote Sensing Satellites by 2025 which will provide unique opportunities for obtaining information about the environment, its state and human impact.

42. In the framework of the Digital Economy national program, Roscosmos has been implementing the Digital Earth project. This is a range of industrial information services designed to provide governmental agencies and commercial companies with analytical products and reports based on satellite imagery. This range includes 27 monitoring products in seven key areas - emergency situations, agriculture and forestry, environmental protection, subsurface use, construction and land management.

43. The operation of the International Space Station will continue until 2024. This will allow performing experiments not only for the benefit of the socio-economic sphere but also for ensuring development of advanced technologies and space systems necessary for the implementation of lunar and deep space exploration programmes.

44. ***The Republic of Türkiye*** has significantly accelerated the progress in space technologies, with the establishment of the Turkish Space Agency (TUA) and the announcement of the National Space Program. The TUA was established as an affiliated body of the Ministry of Industry and Technology, upon the Presidential Decree No. 23 of 13 December 2018, with the aim to conduct the research and activities in space sciences, space exploration and the use of space. The National Space Program Strategy was published in the Official Gazette No. 31845, on 24 May 2022.

45. The National Space Program was announced by the President of the Republic, on 9 February 2021. It represents a 10-year vision, consisting of far-reaching goals, including independent access to space, national independence in critical technologies, contribution to science, use for peaceful purposes, soft power, commercial benefit and social awareness.

46. Türkiye has come a long way in the field of space, over the last 25 years and has the scientific and technical infrastructure to produce its own satellites. After the launching of Türksat 1B in 1994, were launched Türksat 1C, Türksat 2A, Türksat 3A. After 2010 communication satellites Türksat 4A, Türksat 4B, Türksat 5A, were launched. Türksat 5B was launched in 2021. Türkiye's satellite development efforts increased since 2000 and Earth observation satellites were developed. BİLSAT was launched in 2003, as Türkiye's first Earth monitoring and remote sensing satellite. In 2011, RASAT was launched as the first national and domestic micro-scale satellite. The first reconnaissance satellite Göktürk 2 was launched in 2012.

47. The IMECE satellite project was developed to be used in sub-meter satellites, nationally and locally. The production of the IMECE satellite was completed in 2020 and will be launched in 2023. TURKSAT 6A is planned to be launched in 2022, with the aim to establish the necessary infrastructure for the national satellite communication system. Moreover, the first cubic satellite project İTÜpSAT1 was launched in 2009.

48. The Space Technologies Research Institute (TUBITAK UZAY) was established in 1985 with the aim of creating the infrastructure and knowledge in the field of space. More than a thousand employees work in the space sector in the framework of TUBITAK UZAY, ASELSAN, TURKSAT and TUSAŞ.

49. The Ministry for Strategic Industries of ***Ukraine*** is in charge of ensuring formation and implementation of the State Policy on space activities. The State Policy is implemented by the State Space Agency of Ukraine (SSAU). Space activities in the field of defence and national security are carried out by the Ministry of Defence and intelligence agencies of Ukraine, implementing the National Targeted Scientific and Technical Space Program for creating and

using military and dual-use space technologies together with the respective ministries and other central executive authorities.

50. Legal regulation of space activities in Ukraine is defined by the Constitution of Ukraine, the UN space treaties ratified by Ukraine, the Law of Ukraine "On Space Activities", other laws and regulations. Ukraine is following the path of liberalization and deregulation in the field of space activity. Thus, the Law of Ukraine "On Amendments to the Law of Ukraine on Amendments to Certain Laws of Ukraine on the State Regulation of Space Activities" was adopted in 2019. The main goals of the Law were to create conditions for developing domestic space industry, enhancing its investment attractiveness, creating a competitive environment for space entities of different forms of ownership, providing state support for commercialization of space activities, ensuring evolutionary development and consistency of public policy reform in the field of space exploration and use, effective use of the scientific and technical potential of Ukraine, the opportunities provided by space activities, in the interests of the national economy, science, state security and for commercial purposes, promoting international cooperation, preserving and developing existing international communications in the space industry.

51. Ukraine has a developed space industry and a wide range of competencies in this area. The space activities of Ukraine aim to ensure the effective use of space capacity and enhance its impact on solving challenges in the socio-economic, environmental, information, scientific and educational development of the society, as well as on promoting the state interests in the fields of national security and defence. One of the ways to promote national interests in the field of space activities is to stimulate and expand international cooperation, implement joint projects, in particular within the framework of the EU Horizon Europe program, ESA, NASA and other leading space agencies. Ukraine plans to implement the measures for developing space activities and using its results for the benefit of the state, as well as to achieve the goals of sustainable development, improve security and defence, ensure economic development and promote wellbeing of the population.

V CONCLUSION

52. Space activities, as the main product of global scientific and technological progress, have become a powerful engine of development, transferring to other areas of the global economy, an invaluable and unprecedented flow of new technologies and scientific developments, making a significant contribution to the sustainable development. Today, the space activity and its research and development base have already become a naturally functioning branch of the global economy, subject to universal patterns and development trends. Many countries have already benefited from the space technology, whether they have their own space programs or not. The countries of the Wider Black Sea region closely follow the latest evolutions in the field and invest in the expansion of space technologies, in line with their socio-economic development specificities.

53. The space sector of the global economy demonstrates a dynamic and stable development, which is associated with the processes of a powerful transfer of space technologies to the civil sphere and the development of a wide range of commercial services related to the space industry and development. This contributes to the commercialization of the space activities and the rapid growth of the space industry, the development of technologies and services, which, in turn, gives a strong impetus to an increased industry competition at different levels: global, interregional, interstate, and national. One of the key drivers of the modern economic progress are the innovative technologies in the field of microelectronics, digital and information systems, software, communications and telecommunications, new composite materials, etc., which originate in various areas of the space industry and have a significant impact on the most diverse areas of

modern life. The BSEC Member States encourage scientific and technical progress and innovation capacity.

54. Young people should play a key role in the development of space research. It is important to organize programs to popularize space topics, work in the field of career guidance for young generation, conduct popular science lectures, forums and contests, in order to provide a unique experience with participating experts and exchange of experiences. Thus, the BSEC Member States need to consider the possibility to enhance the space education and training activities as well as the collaboration among educational institutions and research centres in the region.

55. For the successful development of the space industry, it is necessary to develop an effective national legislative framework. Hence, it is useful to use the experience of leading countries (USA, Russia, China), which are world leaders in this sphere. The space research also influences the military sphere; therefore, it is necessary to separate at the legislative level public and private sector activity spheres. It is also necessary to pay due attention to opening new areas of training related to outer space activities.

56. National governments and their respective space agencies or geospatial departments may actively share data with bilateral and multilateral organizations. Cooperation in various forms-bilateral, regional and international- is to be promoted in order to stimulate capacity-building, information and infrastructure sharing, for the development and enhancement of space technology. Activities that support the development of regional policies, research and data sharing, should be encouraged. These collaborations and partnerships contribute to the knowledge transfer and to the building of technological capabilities in aerospace and science, as well as the technological progress and innovation in the region. The role of the BSEC and the PABSEC is to initiate and stimulate the processes of regional cooperation in this area, by using the capacities within their competences.

57. Space exploration opens up new prospects for the world civilization, aiming at improving the well-being of citizens and solve the common global problems of the mankind. By promoting broad international cooperation in the field of exploration and use of the outer space, the BSEC Member States should develop appropriate strategies and programs in order to foster mutual understanding in the field of space activities and strengthen friendly relations among the states and peoples.