CHALLENGES IN APPLICATION OF INTERNATIONAL SPACE LAW FROM THE PERSPECTIVE OF EASTERN AND CENTRAL EUROPEAN COUNTRIES

Maria Buzdugan[1]
Postdoctoral Fellow
McGill University, Institute of Air and Space Law
Montreal, Canada

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[1] maria.buzdugan@mcgill.ca The author expressed her gratitude for the opportunity provided by Prof. Dr. Nataliya Malysheva and the International Center for Space Law, and the United Nations Office for Outer Space Affairs in Vienna.

Challenges in Application of International Space Law from the Perspective of Eastern and Central European Countries

Eastern European countries are increasingly becoming more dependent on space applications and technologies, while the overall level of ratification of the five international space treaties in the region is relatively low, compared to other regions in the world. Although in the past, they were part of a common political system, after the disintegration of the Soviet Union and the fall of the Iron Curtain, these countries (and the newly-formed States) followed somewhat different political and economic paths. Today, Eastern Europe appears as a heterogenic conglomerate of States, at different stages of economic development, with different economic needs, and within different geo-political contexts. Given the current and prospective space activities in Eastern European countries, the question of the status of application and implementation of international space law treaties in the region becomes very important, especially from the perspective of understanding the obstacles to broader ratification and implementation of such treaties. This report attempts to provide an overview of the types of space activities in Eastern Europe, a comparison of the level of ratification of international space treaties in this region against levels of ratification in other regions in the world, and to determine possible causes for non-ratification and potential solutions that would allow to a wider ratification of international space law instruments in the region.[2]

1. Introduction

The space race, started more than 50 years ago between the former Soviet Union and the United States, was vastly motivated by considerations of national prestige and power. The countries from the Soviet Bloc[3] were made part, to some degree, to space exploration within the framework of Intercosmos program, run and financed almost exclusively by the Soviet Union.[4] The space industry and ground facilities were mostly concentrated on the territory of the Former Soviet Union. Although Russia was the one most actively involved in space exploration, with its research institutions, as well as ground tracking stations and spacecraft control centers, other Soviet republics contributed as well to space activities.[5] For example, Ukraine had a relatively strong space industry, with launching capabilities and several important ground tracking stations. Kazakhstan's Bajkonur cosmodrome was by far the most technically advanced and the best located launching facility in former Soviet Union. Other Eastern European countries were also involved in

[2] This report considers as Eastern European countries the countries of the former Soviet Bloc (except East Germany), and all current members of the Commonwealth of Independent States (CIS), including those that are geographically part of Asia.

[3] The "Soviet Bloc" is meant to refer to former communist States of Eastern Europe, including Yugoslavia and Albania, as well as the countries of the Warsaw Pact.

[4] The Intercosmos program was established according to the temporary Agreement on Cooperation of Working Groups signed in 1968 and supplemented by a more general Agreement on Cooperation in the Exploration and Use of Outer Space for Peaceful Purposes (signed on 13 July 1976).

[5] Elena Kamenetskaya, "The Present Developments of Legal Regulations of Space Activities in Russia and Commonwealth of Independent States", Akron Law Review (Winter/Spring 1993) 465 at 470-471.

carrying out space activities, by their participation in manned space flight missions,[6] as well as collaborating in launching unmanned satellites.[7]

After the end of the cold war and the collapse of the Soviet Union and of the centralized communist regimes in the region, the focus and structure of space activities changed. The Intercosmos program was dissolved and most of the national programs in Eastern European countries suffered severe financial shortages.[8] The Russian space program also registered a decline, although it still maintained a strong scientific, technological and operational base.[9] Agreements between the Russian Federation and the States now forming the Commonwealth of Independent States were concluded to define the conditions of future collaboration among these States in space activities.[10] In addition, the Russian Federation and Kazakstan concluded bilateral agreements on the access and use of the Bajkonur cosmodrome.[11] In should be noted that the other State members of the Commonwealth of Independent States (CIS) have also accumulated significant scientific and technical capabilities.

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[6] See, for example, the participation in various Soyuz missions of cosmonauts from Eastern European countries (the Czech cosmonaut, Vladimír Remek, in February 1978; Polish cosmonaut Mirosław Hermaszewski, in June 1978; Bulgarian cosmonaut Georgi Ivanov, in April 1979; Hungarian cosmonaut Bertalan Farkas, in May 1980; Romanian cosmonaut Dorin Dumitru Prunariu, in May 1981).

[7] See, for example, the 1979 launch of a satellite manufactured in formed Czechoslovakia (satellite that had the purpose of researching the magnetosphere and the ionosphere of the Earth). See "Information Furnished in Conformity with the Convention on Registration of Objects Launched into Outer Space, Note Verbale dated 13 June 1979 from the Permanent Representative of Czechoslovakia to the United Nations addressed to the Secretary General", UN Doc ST/SG/SER.E/22 (11 July 1979), available online: United Nations, Committee on the Peaceful Uses of Outer Space website.

[8] Mahulena Hofmann, "European Transformation: Countries on their Path to ESA", Paper presented at the 57th International Astronautical Congress, Valencia, Spain, 2nd-6th October, 2006.

[9] "Towards a Space Agency for the European Union", A report by Carl Bildt, Jean Peyrelevade, Lothar Spath to the ESA Director General.

[10] See, for example, the Agreement on Joint Activities in the Exploration and Use of Outer Space, signed by nine members of CIS on 30 December 1991, in Minsk (31 I.L.M. 143), and the multilateral agreement signed in Tashkent by all CIS member States except Moldova. For example, the Tashkent Agreement establishes, among other provisions, that ground-based facilities of space infrastructure situated on the territories of Azerbaijan, Belarus, Kazakhstan, Russia, Turkmenistan, Uzbekistan and the Ukraine are declared to be the property of these States. The "Tashkent Agreement" Concerning Arrangements for Maintaining and Using Space Infrastructure Facilities in Pursuance of Space Programmes (May 15, 1992), Art. 1, text available online, JAXA website < http://www.jaxa.jp/jda/library/space-law/chapter_4/4-2-2-3_e.html> (date accessed: 17 October 2006). The right to use these facilities is transferred by special agreements to the Strategic Forces (Directorate of Space Resources) or other interested parties. *Ibid*. The use of space infrastructure as part of interstate and independent space programs is carried out by the Interstate Space Council. *Ibid*.

[11] Initially signed on 25 May 1992, the agreement confirmed that Bajknour cosmodrome is the property of Kazakhstan and defined the rights and obligations of Kazakhstan and Russian Federation in the use of these facilities. In 1994, the Russian President signed Edict No 2005 "On the Organization of the Further Utilization of the Baikonur Cosmodrome in the Interests of the Russian Federation's Space Activity" which detailed the lease arrangement between the two governments. More recently, on 8 June 2005, the Russian Federation Council ratified an agreement between Russia and Kazakhstan extending Russia's rent term of Bajkonur spaceport until 2050. The rent price was fixed at 115 million US dollars per year. It is reported that Russia began upgrading its own Plesetsk Cosmodrome in the Arkhangelsk Oblast of Northern Russia as an alternative to using Bajkonur.

Other geo-political changes are also influencing developments in Eastern Europe. Thus, in May 2004, several States that were part of the Intercosmos program became members of the European Union (i.e., Czeck Republic, Hungary, Poland, Slovakia, Slovenia, and the Baltic States: Estonia, Lithuania and Latvia).[12] Starting in 2007, Romania and Bulgaria will also become members of the European Union. Their adherence to the European Union will undoubtedly trigger changes in the space activities and policies of the new member States.

New international players are emerging on the space arena, such as China, India, Japan, the European Union and Brazil. Also, the main motivator of space activities appears to shift towards uses that address new global concerns, such as protection of the environment, weather forecasting, global navigation services and telecommunications.[13] Given these beneficial uses, space-based technologies and applications are proving essential in disaster prevention and mitigation, poverty alleviation and community development. Thus, space applications appear to play an increasingly important role in improving the overall quality of life and in stimulating economic progress. As a result, space research and the use of various space technologies, particularly in the areas of management of natural resources, environmental monitoring, weather forecasting, disaster management and public health, have became a priority in many developed as well as developing countries. Many of the Eastern European countries are no exception.

2. Overview of Current and Forthcoming Space Applications in the Eastern European Countries

While the use of space technologies in Eastern Europe has increased significantly in the recent years, national capabilities in the use of space technologies vary from country to country. The Russian Federation remains, together with the United States, a leading space power despite recent financial constraints, with launching capabilities that enjoy to-date an excellent record of reliability; it has also placed numerous satellites in orbit for various civilian and military purposes and is maintaining its manned space flight program within the International Space Station (ISS) framework. The Ukraine is also actively involved in space activities, particularly in developing space telecommunication systems, satellite radio-navigation systems, and remote sensing technology using its own satellites or data from satellites launched by other countries.[14] In addition, the Ukraine maintains launching capabilities and conducts research on near-Earth space, space biology, biomedicine and weightlessness physics.[15] Another country that appears to be substantially engaged in space activities is the Czech Republic, with 7 notifications to the UN Secretariat (according to the Registration Convention requirements) of satellite launches (including one submitted by Czechoslovakia in 1979), most recent one being

[12] Treaty concerning the accession of the Czech Republic, the republic of Estonia, the republic of Byprus, the Republic of Latvia, the republic of Lithuania, the Republic of Hungary, the Republic of Malta, the Republic of Poland, the republic of Slovenia, and the Slovak Republic to the European Union.

[13] "Towards a Space Agency for the European Union", A report by Carl Bildt, Jean Peyrelevade, Lothar Spath to the ESA Director General.

[14] UN General Assembly, Committee on the Peaceful Uses of Outer Space, International cooperation in the peaceful uses of outer space: Activities of Member States", UN Doc. A/AC/105/778 at 43.

[15] UN General Assembly, Committee on the Peaceful Uses of Outer Space, International cooperation in the peaceful uses of outer space: activities of Member States", UN Doc. A/AC/105/778 at 40.

submittted in 2003. These satellites were all manufactured by Czech engineers and were launched using Russian launch vehicles. Another country that is becoming more actively involved in the space field is Belarus, that recently announced plans to develop a system that would include both a ground segment and a space segment with the aim of creating space-based applications to be used "in the daily business of state administration and economic activity."[16]

Among various space technologies, Earth observation satellites provide essential data that can assist in all phases of disaster management: disaster preparedness, mitigation, relief, and rehabilitation.[17] Another useful application of space technologies is for improving natural resources management, cartography, land use and protection of the environment. Space-based applications are an essential tool for the long-term monitoring of environmental changes and early warning of environmental degradation or pollution. Such space-based solutions are already an integral part of disaster management and environmental monitoring activities in many Central and Eastern European countries and of the Central Asian and Caucasus regions.

For example, the Russian space system for the remote sensing of Earth uses data supplied by hydrometeorological and fast-natural-resources survey satellites. These remote sensing information is used to address a wide variety of tasks in such fields as agriculture, climatology and weather forecasting, efficient land management, prospecting for mineral resources, forestry, water resource management and monitoring of emergency situations.[18]

Another example is the one of the Romanian Space Agency (ROSA) which has taken a leading role in promoting the use of space technology for disaster management.[19] ROSA is currently developing and implementing applications of space technologies to risk and disaster management keeping in mind specific national and regional characteristics. ROSA conducts studies on specific natural disasters, such a floods, earthquakes and landslides.[20]

In Azerbaijan, the Azerbaijan National Aerospace Agency (ANASA) is actively using remote sensing for disaster management, including prediction of potential disasters caused by seismic activity and mapping degradation of arid areas of the Caspian Sea coastal zone.[21] Poland reported that its remote sensing centers concentrate their activities

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[16] General Assembly, Committee on the Peaceful Uses of Outer Space, International cooperation in the peaceful uses of outer space: activities of Member States", UN Doc. A/AC/105/832 at page 3.
[17] UN GA, UN Regional workshop on the use of space technology for disaster management for Europe (Poiana Brasov, Romania, 19-23 May 2003), UN Doc A/AC.105/808.
[18] UN General Assembly, Committee on the Peaceful Uses of Outer Space, International cooperation in the peaceful uses of outer space: activities of Member States", UN Doc. A/AC/105/832/Add.3 at page 9.
[19] UN GA, UN Regional workshop on the use of space technology for disaster management for Europe (Poiana Brasov, Romania, 19-23 May 2003), UN Doc A/AC.105/808.
[20] Romanian Space Agency (ROSA) website < http://web.rosa.ro/rosa.htm> (date accessed: 3 October 2006).
[21] UN General Assembly, Committee on the Peaceful Uses of Outer Space, "International cooperation in the peaceful uses of outer space: activities of Member States" UN Doc. A/AC.105/788 at 3.

on land applications of satellite data, with a particular emphasis on the development and operational use of a remote-sensing based system for crop condition assessment and weather forecasting.[22] Bulgaria reported as well that it is using remote sensing data for environment monitoring and conservation issues and crop and forest monitoring.[23] Czech Republic and Slovakia also submitted reports to COPUOS regarding their use of remote sensing data for flood forecasting, monitoring of air pollution effects on forestry and assessment of landscape changes.[24] Also, starting in 2006, Tajikistan reported that will start research of remote sensing data of Earth from outer space in "the interest of the national economy of Tajikistan."[25] Some countries in the region declared that they do not have national programs associated with the use of outer space,[26] although many of them conduct space-related research in their universities[27] and almost all use satellite remote sensing data for land applications.

The table below summarizes the countries that reported to the UN Committee on the Peaceful Uses of Outer Space (COPUOS) space-related activities.

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[22] UN General Assembly, Committee on the Peaceful Uses of Outer Space, International cooperation in the peaceful uses of outer space: activities of Member States", UN Doc. A/AC/105/752/Add.2 at page 14.
[23] UN General Assembly, Committee on the Peaceful Uses of Outer Space, International cooperation in the peaceful uses of outer space: activities of Member States", UN Doc. A/AC/105/661 at pages 16-17.
[24] UN General Assembly, Committee on the Peaceful Uses of Outer Space, International cooperation in the peaceful uses of outer space: activities of Member States", UN Doc. A/AC/105/661 at page 18. UN General Assembly, Committee on the Peaceful Uses of Outer Space, International cooperation in the peaceful uses of outer space: activities of Member States", UN Doc. A/AC/105/788 at page 26.
[25] UN General Assembly, Committee on the Peaceful Uses of Outer Space, International cooperation in the peaceful uses of outer space: activities of Member States", UN Doc. A/AC/105/857/Add.1 at 4.
[26] See for example, Latvian statement in UN General Assembly, Committee on the Peaceful Uses of Outer Space, International cooperation in the peaceful uses of outer space: Activities of Member States", UN Doc. A/AC/105/817 at 9; and Statement by Slovenia in UN General Assembly, Committee on the Peaceful Uses of Outer Space, International cooperation in the peaceful uses of outer space: activities of Member States", UN Doc. A/AC/105/614/Add.2 at 31.
[27] For example, Latvia reports that several of its national universities carry out some research in the filed of remote sensing for assessment of the environmental situation. UN General Assembly, Committee on the Peaceful Uses of Outer Space, International cooperation in the peaceful uses of outer space: activities of Member States", UN Doc. A/AC/105/857 at 6. Similarly, Slovenia reports that several teams of Slovenian researchers carry out research activities related to the peaceful uses of space and that involve certain aspects of space-related components, along with the international involvement of certain researchers and research groups in space research programs. UN General Assembly, Committee on the Peaceful Uses of Outer Space, International cooperation in the peaceful uses of outer space: activities of Member States", UN Doc. A/AC/105/788 at 33.

Table 1. Summary of Space-related Activities Reported to the COPUOS by Various Countries in the Central and Eastern Europe and Central Asia and Caucasus Regions

Country	Launching Capability	Satellites in Orbit	Use of Remote Earth Sensing Data	Research on Space-related Matters
Azerbaijan			X	X
Belarus		X (planned)	X	X
Bulgaria			X	X
Czech Republic		X	X	X
Hungary			X	X
Latvia				X
Kazakhstan	X			
Poland			X	X
Romania			X	X
Russian Federation	X	X	X	X
Slovakia			X	X
Slovenia				X
Tajikistan			X	X
Ukraine	X	X	X	X

3. Examples of Cooperation in Space-related Activities in Central and Eastern European Countries and of the Central Asian and Caucasus Regions

Several countries in the regions under analysis have entered in various forms of agreements of cooperation with countries from the same region or from other regions in regard to space-related activities. For example, on 17 February 2000, the Governments of Belarus, Kazakhstan, the Russian Federation and Tajikistan concluded an agreement concerning their cooperation in the use of outer space for peaceful purposes.[28] Several bilateral cooperation initiatives were also undertaken in the region. For example, the Russian Federation and Belarus set up the new program entitled "Development and use of prospective space facilities and technologies in the interests of economic and scientific developments of the Union States" (referred to as "Cosmos SG") a continuation of the Cosmos-BR Program.[29] The objectives of the new program are the development of elements of a single system for supplying Russian and Belarusian users with remote Earth sensing information, a high-speed telecommunications system, the development of the ground segment of an inter-State navigational system of extended precision, and

[28] UN General Assembly, Committee on the Peaceful Uses of Outer Space, International cooperation in the peaceful uses of outer space: activities of Member States", UN Doc. A/AC/105/857 at page 2.

[29] The joint Belarus/Russian Federation Cosmos-BR program was completed in 2002. This program has as aim the development of technologies for using remote Earth sensing and satellite navigation information for various ecological and national economic purposes. UN General Assembly, Committee on the Peaceful Uses of Outer Space, "International cooperation in the peaceful uses of outer space: activities of Member States", UN Doc. A/AC/105/816 at page 2.

using as effectively as possible and developing further the space potential of the Russian Federation and Belarus with the aim of addressing social and economic issues and "solving problems in fundamental and applied sciences and in technology."[30]

Another example of cooperation on space-related activities is between the Russian Federation and the Ukraine, which covers such areas as: preparations for the launch and operations of satellites (such as the Ukrainian/Russian Okean-O satellite), implementation of the commercial space projects related to Sea Launch, and research and experiments aboard the Russian segment of the International Space Station (ISS).[31]

Also, the Russian Federation is cooperating with other States in order to address global issues such as: international space environmental monitoring systems; space systems for forecasting hazardous natural phenomena and monitoring man-made disasters; global satellite systems for search and rescue of sea vessels and aircraft in distress, satellite systems for tracking the movement of particularly important loads and moving objects, global system of control, monitoring and mitigation of space debris in the interests of ensuring the safety of space flights, and unified space system for monitoring compliance with international treaties and agreements.[32] To these ends, the Russian Federation concluded several other inter-governmental agreements of cooperation in exploring and using outer space with, *inter alia*, Argentina, Australia, Brazil, Bulgaria, Chile, China, France, Germany, India, Italy, Japan, the Republic of Korea, Sweden, and the United States.[33]

The Russian Federation is also involved in forms of international cooperation that concern the provision of services in connection with launches of foreign spacecraft using Russian orbiting facilities; installation of scientific instrumentation on behalf of foreign clients on board Russian spacecraft for the purposes of scientific and technological research; use of Russian satellites for various specific purposes on behalf of foreign clients; leasing of spacecraft and ground-based infrastructure; joint planning, development and manufacture of spacecraft with foreign partners; exchange of information and space technologies in various areas of space activity; flights by cosmonauts and astronauts on board manned Russian spacecraft; training of foreign specialists in the exploration and use of outer space.[34]

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[30] UN General Assembly, Committee on the Peaceful Uses of Outer Space, "International cooperation in the peaceful uses of outer space: activities of Member States", UN Doc. A/AC/105/816 at page 3.
[31] UN General Assembly, Committee on the Peaceful Uses of Outer Space, "International cooperation in the peaceful uses of outer space: activities of Member States", UN Doc. A/AC/105/832/Add.2 at page 20.
[32] UN General Assembly, Committee on the Peaceful Uses of Outer Space, "International cooperation in the peaceful uses of outer space: activities of Member States", UN Doc. A/AC/105/661/Add.2 at page 25.
[33] UN General Assembly, Committee on the Peaceful Uses of Outer Space, "International cooperation in the peaceful uses of outer space: activities of Member States", UN Doc. A/AC/105/788 at page 26. UN General Assembly, Committee on the Peaceful Uses of Outer Space, "International cooperation in the peaceful uses of outer space: activities of Member States", UN Doc. A/AC/105/788 at page 26.
[34] UN General Assembly, Committee on the Peaceful Uses of Outer Space, "International cooperation in the peaceful uses of outer space: activities of Member States", UN Doc. A/AC/105/661/Add.2 at page 25.

The Ukraine has also entered into cooperation agreements with other countries on space-related matters. For example, the cooperation between the Ukraine and China involves long-term projects for the development of space rocket technology and the implementation of scientific programs, in particular the Moon research program.[35] Similarly, the cooperation between Ukraine and India on space-related activities focuses on the joint development of space technologies. Also, Ukraine concluded important international documents for the future of the national space sector, namely bilateral treaties on cooperation in the field of outer space with Argentina, Brazil,[36] Israel and Turkey. The documents expand the legal framework for cooperation with those countries and provide the basis for carrying out a range of large-scale commercial projects.[37]

Several Central and Eastern European countries participate in an important regional initiative carried out by the European Commission and European Space Agency (ESA), i.e. the GMES program (Global Monitoring for Environment and Security). These countries are Croatia, Hungary, Latvia, Poland, Slovakia, Estonia, Lithuania, Slovenia, Bulgaria, Czech Republic, and Romania.[38] It is expected that such participation will strengthen these countries' use of Earth observation data for agricultural planning, crop forecasting and flood monitoring.[39]

Another example of involvement in regional cooperation of the countries in the regions under analysis is the Action Committee on Global Navigation Satellite Systems (GNSS). The UN General Assembly Resolution 54/68 of 6 December 1999 endorsed the Resolution of UNISPACE III entitled "The Space Millenium: Vienna Declaration on Space and Human Development". The Vienna Declaration called for action to improve the efficiency and security of transport, search and rescue, geodesy and other activities by promoting the enhancement of, universal access to and compatibility with space-based navigation and positioning systems. In response to that call, the Committee on the Peaceful uses of Outer Space established, in 2001, the Action Committee on GNSS to carry out those actions under the chairmanship of Italy and the United States. Among the 38 member States of the Action Team on GNSS, there are 8 Eastern European countries, i.e, Belarus, Bulgaria, Czech Republic, Hungary, Poland, Romania, the Russian Federation, the Ukraine.[40] In 2005, the International Committee on GNSS (ICG) was established as an informal body that would promote the use of GNSS while facilitating the interoperability of the GPS of the United States, the Global Navigation Satellite

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[35] UN General Assembly, Committee on the Peaceful Uses of Outer Space, International cooperation in the peaceful uses of outer space: activities of Member States", UN Doc. A/AC/105/832/Add.2 at page 20.
[36] Brazil has been Ukraine's main partner in recent years. An international legislative framework has been drawn up for the implementation of a joint project to design a launch site at the Alcantare cosmodrome. UN General Assembly, Committee on the Peaceful Uses of Outer Space, International cooperation in the peaceful uses of outer space: activities of Member States", UN Doc. A/AC/105/832/Add.2 at page 19.
[37] UN General Assembly, Committee on the Peaceful Uses of Outer Space, International cooperation in the peaceful uses of outer space: activities of Member States", UN Doc. A/AC/105/778 at page 43.
[38] Global Monitoring for Environment and Security website < http://www.gmes.info/nationalactivities.0.html> (date accessed: 15 October 2006).
[39] UN GA, UN Regional workshop on the use of space technology for disaster management for Europe (Poiana Brasov, Romania, 19-23 May 2003), UN Doc A/AC.105/808.
[40] In 2004, the UN general Assembly endorsed the Plan of Action (Resolution 59/2).

System (GLONASS) of the Russian Federation and the Galileo system of the EU (not yet in operation).[41]

A very interesting development is the cooperation of several Central and Eastern European countries with the European Space Agency (ESA). For example, Hungary, Romania, Poland and Czeck Republic have signed Framework Agreements for Cooperation with ESA.[42] These Agreements were replaced by the European Cooperating State Agreements (ECSAs) signed by Hungary and Czech Republic in 2003 and by Romania in 2006.[43] The ECSAs are bilateral agreements between non-member States and ESA that allow the partner countries to participate indirectly in all ESA procurements and activities. Also, to be noted that ESA adopted the policy of the PECS program – the Plan for European Cooperating States (PECS). The main objective of PECS is to associate the countries in question with the Agency's programs and activities and to prepare these countries for possible future accession to the ESA Convention. These plans are concluded for a term of 5 years. The benefits granted by PECS flow towards a country only after it signs the PECS Charter that defines the terms and conditions of the financial contributions of the participating States to the Plan. The PECS Charter was signed by Hungary in 2003 and by Czech Republic in 2004.[44] It is expected that Romania will sign a similar instrument in 2007.[45]

Another country that started its cooperation with ESA, although is not on track of becoming an EU member, is the Ukraine. In 2004, this country enhanced its cooperation with the European Union on space-related activities. The main objective of the Ukrainian space policy in the European context is to obtain the status of associate member of ESA and to participate in the design of Galileo, the European global satellite navigation system.[46]

A number of space-related activities are carried out through inter-agency cooperation agreements on the use of space science and technology and their applications. For example, the Bulgarian Space Agency has signed agreements for cooperation with the National Space Agency of Kazakhstan, National Space Agency of the Ukraine, and Romanian Space Agency.[47] Similarly, the Azerbaijan National Aerospace Agency (ANASA) signed a memorandum of understanding concerning the

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[41] UN International Meeting for the Establishment of the International Committee on Global Navigation Satellite Systems was held in Vienna on 1 and 2 December 2005. UN GA, COPUOS, Report of the Expert on Space Applications, UN Doc. A/AC.105/861.

[42] Agreement between the Government of Hungary and the ESA Concerning Cooperation in the Exploration and Use of Outer Space for Peaceful Purposes of 1991, Romania of 1992, Poland of 1994 and the Czech Republic of 1996.

[43] Poland has not decided yet to sign such an ECSA.

[44] UN General Assembly, Committee on the Peaceful Uses of Outer Space, International cooperation in the peaceful uses of outer space: activities of Member States", UN Doc. A/AC/105/832/Add.1 at page 12.

[45] Romanian Space Agency (ROSA) website < http://web.rosa.ro/rosa.htm> (date accessed: 3 October 2006).

[46] UN General Assembly, Committee on the Peaceful Uses of Outer Space, International cooperation in the peaceful uses of outer space: activities of Member States", UN Doc. A/AC/105/832/Add.2 at page 20.

[47] UN General Assembly, Committee on the Peaceful Uses of Outer Space, International cooperation in the peaceful uses of outer space: activities of Member States", UN Doc. A/AC/105/661 at page 17.

cooperation in the exploration and use of outer space exclusively for peaceful purposes with the Romanian Space Agency (ROSA).[48] ANASA also signed, in April 2004, a protocol with Russian Aviation and Space Agency (Rosariakosmos) covering new areas of cooperation, including setting up a ground complex to receive and process space information in Azerbaijan, monitoring the ecology of oil-processing and oil-extraction areas, assessing the current and future status of agricultural areas, monitoring ecological and technological risks, and developing and producing receivers for global navigation satellite systems (GNSS) and supplying them to the Azerbaijani domestic market.[49]

In order to make the application of the space science and technology in a country's economy in an effective manner, governments must create the necessary economic and legal framework for that country's space activities.[50] The need for effective laws and policies on space activities at both the international and national levels is becoming clear to the increasing number of States conducting space activities or concerned with the use of space applications. This report focuses on the international law applicable in the field of space activities and the status of its application in the countries of Central and Eastern Europe and of Central Asian and Caucasus regions.

4. Status of Ratification of International Space Law Treaties in the States of Central and Eastern Europe and of Central Asian and Caucasus Regions

To date, five international agreements dealing with space activities were adopted within the framework of United Nations:[51] *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies,* 27 January 1967;[52] *Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space*, April 22, 1968;[53] *Convention on International Liability for Damage Caused by Space Objects*, March 29, 1972;[54] *Convention on Registration of Objects Launched into Outer Space*, January 14,

[48] UN General Assembly, Committee on the Peaceful Uses of Outer Space, International cooperation in the peaceful uses of outer space: activities of Member States", UN Doc. A/AC/105/832 at page 4.
[49] UN General Assembly, Committee on the Peaceful Uses of Outer Space, International cooperation in the peaceful uses of outer space: activities of Member States", UN Doc. A/AC/105/832 at page 4.
[50] UN General Assembly, Committee on the Peaceful Uses of Outer Space, International cooperation in the peaceful uses of outer space: activities of Member States", UN Doc. A/AC/105/832/Add.3 at 13.
[51] In addition to these five treaties, the United Nations Organization has adopted resolutions dealing with the use by states of artificial earth satellites for international direct television broadcasting; the remote sensing of the Earth from outer space, and the use of nuclear power sources in outer space. Such documents are not legally binding. This report will only examine the application of the five treaties in the Eastern European countries.
[52] 610 U.N.T.S. 205, 18 U.S.T. 2410, T.I.A.S. No. 6347, 6 I.L.M. 386 [hereinafter *Outer Space Treaty*] (entered into force on 10 October 1967).
[53] 672 U.N.T.S. 119, 19 U.S.T. 7570, T.I.A.S. No. 6599, 7 I.L.M. 151 [hereinafter *Rescue Agreement*] (entered into force 3 December 1968).
[54] 961 U.N.T.S. 187, 24 U.S.T. 2389, T.I.A.S. No. 7762 [hereinafter *Liability Convention*] (entered into force on 1 September 1972).

1975;[55] and, *Agreement Governing the Activities of States on the Moon and Other Celestial Bodies*, December 5, 1979.[56]

The Outer Space Treaty (OST) is considered to be the fundamental instrument of international space law since it contains the main principles regulating space activities. The major principles of international space law enshrined in the Outer Space Treaty and the other above-mentioned international agreements on space include non-appropriation of any part of the outer space, peaceful uses of outer space, and protection of the environment. These principles create an international legal regime that allows for space activities to be conducted in an environment of international peace and security.

For this reason, the United Nations General Assembly, in its annual resolutions on international cooperation in the peaceful uses of outer space, has urged States that have not yet become parties to the UN space treaties to give consideration to ratifying those treaties as well as incorporating them into their national legislation.[57]

The principle of conducting the exploration and use of outer space for the benefit and in the interest of all countries triggers one major practical benefit that applies both to States that actively carry out space activities and those that are only using space-based technology.[58] As of January 1, 2006, 98 States were parties to the Outer Space Treaty (out of the 192 Member States of the UN), 88 States were parties to the Rescue Agreement, 83 States ratified the Liability Convention, 47 States were parties to the Registration Convention, and 11 States ratified the Moon Agreement.[59]

Table 2 lists the Eastern and Central European countries considered for this study and the status of ratification of the five international space law treaties. Note that, for the purposes of this analysis, "Eastern and Central Europe and the Central Asian and Caucasus regions" is understood to include only the countries from the former Soviet Bloc and all countries that are part of the Commonwealth of Independent States (CIS).

This table shows that only one country from these regions, i.e., Kazakhstan, ratified all five space law treaties. Eight countries, i.e., Belarus, Bulgaria, Czech Republic, Hungary, Poland, Russian Federation (as successor of the Former Soviet Union), Slovakia and the Ukraine, ratified four of the treaties (they did not ratify the Moon Agreement). Two States ratified three of the five treaties and signed one other (such as Romania – that ratified the Outer Space Treaty, the Rescue Agreement, the Liability

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[55] 1023 U.N.T.S. 15, 28 U.S.T. 695, T.I.A.S. No. 8480, 14 I.L.M. 43 [hereinafter *Registration Convention*] (entered into force on 15 September 1976).

[56] 1363 U.N.T.S. 3, 18 I.L.M. 1434 [hereinafter *Moon Agreement*] (entered into force 11 July 1984).

[57] UNGA, Report on the UN/Nigeria Workshop on Space Law on the theme "Meeting international obligations and addressing domestic needs (Abuja, 21-24 Novemebr 2005), UN Doc A/AC.105/866/Corr.1.

[58] The meaning of "space-faring nation" is somewhat unclear in more recent years when many new players are appearing on the space arena and the use of space-technology is wide-spread in many developing countries as well.

[59] The list of contracting States is published by the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS), "Status of International Agreements Relating to Activities in Outer Space as at 1 January 2005", available online: COPUOS website <http://www.oosa.unvienna.org/Space Law/treatystatus/index.html> (date accessed: 1 October 2006).

Convention, and signed the Moon Agreement, and Serbia - as successor of Yugoslavia- that ratified the Rescue Agreement, the Liability Convention, and the Registration Convention, but only signed the Outer Space Treaty). One State, the Former Yugoslavian Republic of Macedonia, ratified two of the treaties (i.e. the Rescue Agreement and the Liability Convention) and signed one other (i.e. the Outer Space Treaty). Two States, i.e. Bosnia and Herzegovina and Slovenia, ratified only the Rescue Agreement and the Liability Convention. One State, i.e. Georgia, ratified only one of the five treaties, i.e. the Rescue Agreement.

Thirteen States did not ratify any of the five space law treaties, i.e, Albania, Armenia, Azerbaijan, Croatia, Estonia, Kyrgyzstan, Latvia, Lithuania, Republic of Moldova, Montenegro, Tajikistan, Turkmenistan, and Uzbekistan. With the exception of Albania, Croatia, and Montenegro (recently-established independent State), all other States that did not ratify the treaties resulted from the dissolution of the former Soviet Union.

Table 2: Status of ratification of international agreements relating to activities in outer space by Central and Eastern European countries and of the Central Asian and Caucasus Regions[60]

Country	Outer Space Treaty	Rescue Agreement	Liability Convention	Registration Convention	Moon Agreement
Albania					
Armenia					
Azerbaijan					
Belarus	R	R	R	R	
Bosnia and Herzegovina		R	R		
Bulgaria	R	R	R	R	
Croatia					
Czech Republic	R	R	R	R	
Estonia					
Georgia		R			
Hungary	R	R	R	R	
Kazakhstan	R	R	R	R	R
Kyrgystan					
Latvia					
Lithuania					
Poland	R	R	R	R	
Republic of Moldova					
Romania	R	R	R		S
Russian Federation	R	R	R	R	
Serbia	S	R	R	R	
Montenegro					
Slovakia	R	R	R	R	
Slovenia		R	R		
Macedonia	S	R	R		
Tajikistan					
Turkmenistan					
Ukraine	R	R	R	R	
Uzbekistan					

R=ratified
S=signed

[60] As of January 1, 2006. United Nations Committee on the Peaceful Uses of Outer Space (COPUOS), "Status of International Agreements Relating to Activities in Outer Space as at 1 January 2006", available online: COPUOS website <http://www.oosa.unvienna.org/SpaceLaw/treatystatus/index.html> (date accessed: 1 October 2006).

When compared to the level of ratification in other regions of the world, the results are quite surprising. This author grouped the States listed in the UN OOSA list in 7 regions:

WE = includes Western European States (total of 28 States)
AUS = includes States from Australian continent (total of 15 States)
NA = includes States from North American continent[61] (total of 23 States)
SA = includes States from South American continent (total of 12 States)
AS = includes States from Asia (total of 38 States)
AF = includes States from Africa (total of 52 States).

Table 3 lists the number of States by region that have ratified each of the five treaties, with the percentage from the total number of States in that region included in parentheses.

Table 3. Status of ratification of the five space law treaties in each region

Region	Number of countries	Outer Space Treaty	Rescue Agreement	Liability Convention	Registration Convention	Moon Agreement
EE	28	10 (36%)	15 (54%)	14 (50%)	10 (36%)	1
WE	24	19 (80%)	19 (80%)	19 (80%)	15 (62%)	3
AUS	15	6 (40%)	6 (40%)	5 (33%)	2 (13%)	1
NA	23	11 (48%)	9 (40%)	9 (40%)	6 (26%)	1
SA	12	7 (58%)	7 (58%)	7 (58%)	4 (33%)	3
AS	38	25 (66%)	17 (45%)	17 (44%)	8 (21%)	2
AF	52	20 (38%)	16 (31%)	13 (25%)	2 (4%)	0
Total	192	98	88	83	47	11

One may notice that Eastern European countries have the lowest percentage of ratifications of the Outer Space Treaty (when the number of ratifications is measured against the number of countries in the region), while in regard to the other treaties, the level of ratification is the third highest when compared to other regions. The countries of Western Europe have, not surprisingly, the highest percentage of ratifications of the space law treaties.

Table 4 includes the percentage of ratification by region considered against the total number of ratification of a treaty. Eastern European countries represent 10% of the total number of countries that ratified the Outer Space Treaty, 17% of the total number of countries that ratified the Rescue Agreement and the Liability Convention, 10 percent of the total number of countries that ratified the Registration Convention, and 9 percent of the very few countries that ratified the Moon Agreement.

[61] This category includes Central American states, including the Caribbean States.

Table 4: Percentage by region of ratification of international space agreements

Region	Outer Space Treaty	Rescue Agreement	Liability Convention	Registration Convention	Moon Agreement
EE	10 (10%)	15 (17%)	14 (17%)	10 (21%)	1 (9%)
WE	19 (20%)	19 (21%)	19 (23%)	15 (32%)	3 (27%)
AUS	6 (6%)	6 (7%)	5 (6%)	2 (4%)	1 (9%)
NA	11 (11%)	9 (10%)	9 (11%)	6 (13%)	1 (9%)
SA	7 (7%)	7 (8%)	7 (8%)	4 (9%)	3 (27%)
AS	25 (25%)	17 (19%)	17 (20%)	8 (17%)	2 (19%)
AF	20 (21%)	16 (18%)	13 (15%)	2 (4%)	0 (0%)
Total	98	88	83	47	11

Figures 1 to 5 present these percentages for each treaty.

Figure 1

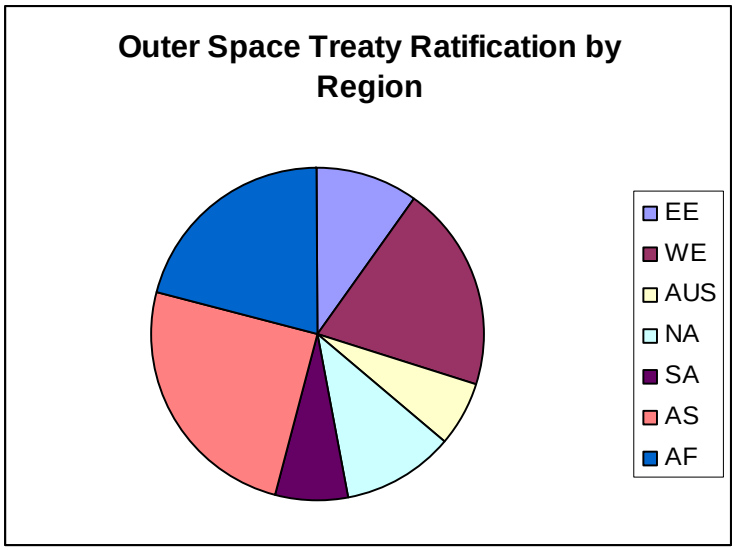


Figure 2

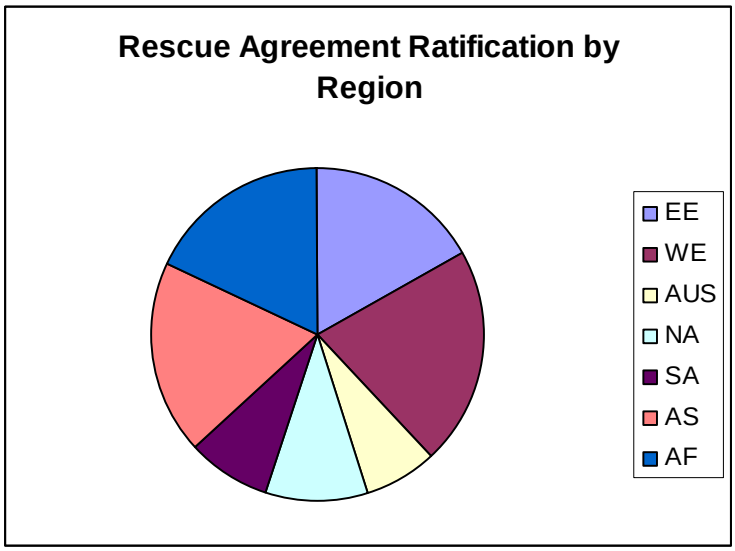


Figure 3

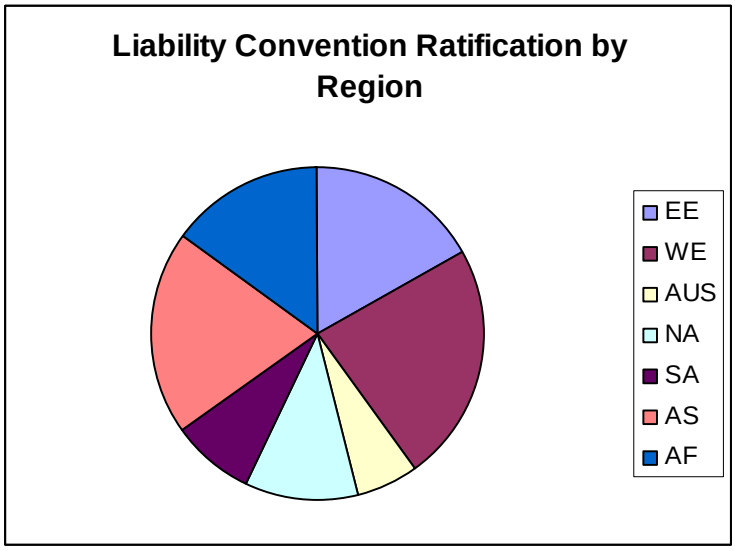


Figure 4

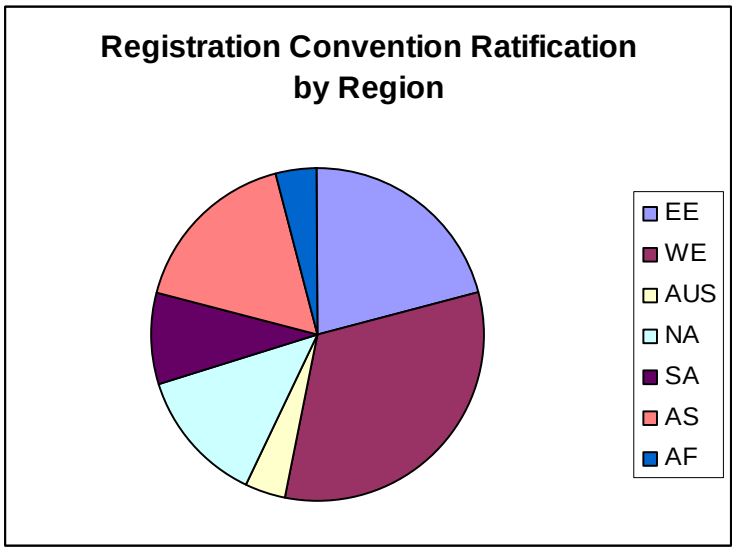
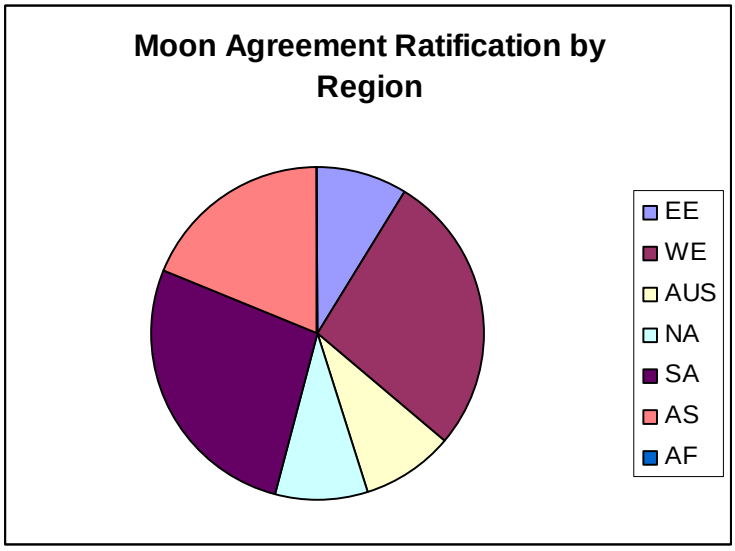


Figure 5



5. Examples of Application of the Five Space Law Treaties in Central and Eastern European Countries and of the Central Asian and Caucasus Regions

Several examples of countries from the region under analysis may be mentioned. For example, under the Registration Convention, a "launching State" is obligated to register each object that is launched into Earth orbit or beyond in a national registry and to supply the information to the Secretary General of the United Nations. To date, only Russian Federation,[62] Czech Republic,[63] Belarus,[64] and the Ukraine[65] have notified the

[62] Actually, the former Soviet Union notified the UN on 18 January 1978 that it has established a registry of space objects launched into Earth orbit or beyond.
[63] Czech Republic notified the UN on 5 August 1996 that it has established a registry of space objects.

UN Secretariat that they have established such national registries. In terms of notifications of launches undertaken by these countries, the Russian Federation leads with approximately 300 notifications (including, of course, launches by the Soviet Union), followed by Czech Republic with 7 notifications (including one notification from Czechoslovakia in 1979), and the Ukraine with 2 notifications under the Registration Convention.

The Liability Convention was applied at the international level only once and it involved the former Soviet Union in a claim formulated by Canada for environmental damage caused by the disintegration and fall of a Russian space object containing a nuclear power source.[66]

States Parties to the space law treaties need also to adopt national laws to implement the provisions of these international agreements at national level. Of all countries in the regions under analysis that have ratified space law treaties, only the Russian Federation and the Ukraine have adopted national space legislation.

6. Obstacles to a Broader Ratification and Application of Space Law Treaties by the Central and Eastern European Countries and of the Central Asian and Caucasus Regions

All countries in Central and Eastern Europe and in the Central Asian and Caucasus regions have undertaken major political reforms in the last 10 – 15 years. Such political reforms were accompanied by fundamental changes in their legal systems, with new laws being adopted in almost all fields of activity. Several States were established following the dissolution of the Soviet Union, Yugoslavia and Czechoslovakia. According to the doctrine of succession, the State is considered the "successor" of the dissolved State is held to be a party to all treaties signed by the predecessor State. For the other States resulting from the dissolution of a State, the process involves express manifestation of intention to be party to every international treaty that was previously signed by the predecessor State.

Although such issues may create confusion that could lead to obstacles in ratification of international treaties, in the case of the space law instruments, several other reasons may be identified as explaining why some Central and Eastern European States and countries of the Central Asian and Caucasus regions have not yet decided to become parties to the international space treaties. Such reasons could be classified in four broad categories:

1. Insufficient awareness of the benefits of ratification of the 5 space law treaties on the part of legislators and decision makers in those countries

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[64] Belarus notified the UN on 13 July 2003 that it has established a registry of space objects.
[65] The Ukraine notified the UN on 12 October 1995 that it has established a registry of space objects launched into Earth orbit and beyond in accordance with Art. II of the Registration Convention.
[66] See the Cosmos 954 case. Government of Canada, Department of External Affairs, Communiqué No. 8, January 23, 1979.

2. Perception that current international legal framework dealing with space activities is inadequate
3. Perception that space activities, and therefore their regulation, are not of immediate concern to decision-makers or are too expensive
4. Challenges of developing capacity in space law (insufficient funding or insufficient expertise in space law).

Regarding the lack of awareness of the benefits of ratification, one may note that the UN space law treaties contain practical benefits that are applicable both to space-faring and non-space faring nations.[67] Broader acceptance of and implementation of the UN space treaties would contribute to the orderly use of outer space, provide transparency with regard to the rights, obligations of States in carrying out space activities, ensure that non-governmental entities comply with the provisions of the treaty, and allow for stability and predictability in conducting space activities.[68] A State Party is in a position to better protect and defend their legitimate rights and interests, to take legal action in accordance with the provisions of the treaties, and to enforce equality between players before law.[69]

Some decision-makers that are aware of the provisions of the UN space law treaties might be under the impression that the current international legal framework deals inadequately with issues such as real property and intellectual property rights in outer space, or insurance issues. Although the current system is not perfect, becoming party to it allows a State to propose treaties' amendment, clarification, updating and revision and also propose new agreements and other instruments to regulate new areas or activities.[70]

Regarding the perception that space activities are not within the immediate reach of one country, a strong argument can be made by pointing out that the main priority of the governmental and non-governmental institutions of a country is to promote better quality of life for its people by providing solutions to basic needs, such as food, clean water, disaster mitigation, health and education services, communications and energy.[71] As shown above, space technology has beneficial applications in the areas of environmental research and monitoring, natural resources management, food security, weather forecasting, disaster management, and public health. The use of remote sensing data and other space-based technologies could bring significant progress in practically all

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[67] The distinction between "space-faring" and "non-space-faring" nations is not very clear these days, with many new actors involved, to various degrees, in the use of outer space activities and technology.
[68] UNGA, Report on the UN/Nigeria Workshop on Space Law on the theme "Meeting international obligations and addressing domestic needs (Abuja, 21-24 November 2005), UN Doc A/AC.105/866/Corr.1.
[69] UNGA, Report on the UN/Nigeria Workshop on Space Law on the theme "Meeting international obligations and addressing domestic needs (Abuja, 21-24 November 2005), UN Doc A/AC.105/866/Corr.1.
[70] UNGA, Report on the UN/Nigeria Workshop on Space Law on the theme "Meeting international obligations and addressing domestic needs (Abuja, 21-24 November 2005), UN Doc A/AC.105/866/Corr.1.
[71] UN GA, Report on the UN/International Institute of Air and Space Law Workshop on Capacity-Building in Space Law (The Hague, 18-21 November 2002), UN Doc A/AC.105/802.

sectors of a country's economy.[72] Therefore, the use of space applications should be integrated into the context of national and regional development priorities.

In terms of costs of space-based technology, an argument that may be formulated is that the use of such technology can improve the cost-benefit ratio that can be expected when limited financial resources are available.[73]

Another obstacle to the application and implementation of international space law in most countries of the Central and Eastern Europe and the Central Asian and Caucasus regions is the lack of sufficient capacity to develop space law. Access to funding is an essential element and innovative solutions for overcoming financial constraints are necessary in order to ensure support on a sustainable basis. Access to expertise in space law is easier to achieve by making use of online resources as means of supplementing educational resources.[74]

7. Conclusion

Advances in satellite communications, remote sensing and global positioning information systems in the Central and Eastern European countries and of the Central Asian and Caucasus regions have made possible the integration of ecological, environmental and health data in order to develop predictive models for weather forecast, environment degradation, infectious-disease surveillance and other public interest applications.[75] Given the growing role that space technology applications play in improving the overall quality of life of people in these regions, creating a proper legal framework both at the international and national levels should become a priority for States. Most countries in the regions under analysis are making use of such technologies, while the level of ratification of the space law treaties is still relatively low when compared to other regions in the world. Among the likely obstacles to a broader ratification of international instruments, this report identified insufficient awareness on the part of legislators and decision makers in those countries of the benefits of ratification of international space law, the perception that current international legal framework dealing with space activities is inadequate or that space activities, and therefore their regulation, are not of immediate concern to decision-makers. The main challenge to developing space law appears to be expensive costs of space-based technology and the lack of expertise in space law. It is possible to overcome all of these reasons. The benefits of becoming parties to the international space law treaties would balance the costs and sacrifices required by such effort.

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[72] UN General Assembly, Committee on the Peaceful Uses of Outer Space, International cooperation in the peaceful uses of outer space: activities of Member States", UN Doc. A/AC/105/857/Add.3 at 13.
[73] UNGA, Report on the UN/International Astronautical Federation Workshop on Making Space Applications Operational: Opportunities and Challenges for Sustainable Development (Albi, France, 27-29 September 2001), UN Doc. A/AC.105/775.
[74] UNGA, Report on the UN/Nigeria Workshop on Space Law on the theme "Meeting international obligations and addressing domestic needs" (Abuja, 21-24 November 2005), UN Doc A/AC.105/866/Corr.1.
[75] UN GA, COPUOS, Report of the Expert on Space Applications, UN Doc. A/AC.105/861 at 8.