

Fledgling Polish Space Industry Ready for Lift–Off

Law as a Risk Management Tool in the Emerging Space Sector

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Abstract

This paper presents an overview of recent developments in Poland from a regulatory and institutional point of view, as well as at a programme level. Though Poles played an active part in setting out the foundations of the international space law, largely through the pioneer of space law – Polish Professor Manfred Lachs – for many years the Polish space industry barely existed, consisting only of the activities of a few engineers brave enough to set up start-ups and cooperate with big international players. The situation changed in 2012, when Poland joined ESA as a full member. Joining ESA and opening up the space industry to small players can be perceived as a significant trigger for the boost of Polish space projects. The first results came quickly. The number of Polish companies active in the sector is growing rapidly, already reaching 300 companies, forming a consistent, consolidated group of large, medium and small enterprises. Over the last five years, the attitude of the government has also been changing.

Concerning regulatory challenges, Poland has still not adopted comprehensive space legislation, though in July 2017, a draft law on space activity was published by the government. The legal concept adopted in the national space law, especially about risk management, may influence the development of the whole national space activity, which still suffers from insufficient capital to bear the high level of risk related to ultra-hazardous activity such as space activity. The recent tendencies covering small sats, New Space, suborbital flight and space mining are also the subject of pending legislative discussions.

Keywords: *outer space, space activity, national space law, liability in space law, Polish space law*

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1. Introduction

This article discusses the origins, subject and scope of the concepts of the Polish space law. The draft once already adopted by the Polish government after a long period of attempts, is still the subject of pending discussions and changing approaches. This concerns not only technical issues, but such key issues as the subject and scope of the ‘space activity’ to be regulated and licensed, the structure of the liability sharing regime and insurance.

The analysis begins with outlining the status of the Polish space industry. This implicates, in the opinion of the author, the specific legal needs and final shape that the Polish space law should take. Subsequently, the paper focuses on some principal issues, such as subject and scope of the ‘space activity’ in Poland, as well as liability and insurance as a risk management tool of the space ventures.

The analysis has taken into account some comparative legal aspects present in the legislation of the other countries. They can serve as suggestions *de lege ferenda* for the Polish legislator and other emerging space countries.

2. Industry and law – adversaries or allies?

2.1 Polish space industry ready for lift off

For many years the Polish space industry barely existed, consisting only of the activities of a few engineers brave enough to set up start-ups and cooperate with big international players. The situation changed in 2012, when Poland joined ESA as a full member. Joining ESA and opening up the space industry to small players can be perceived as a significant trigger for the boost of Polish space projects. The first results came quickly. The number of Polish companies active in the sector is growing rapidly, already reaching 300 companies, forming a consistent, consolidated group of large, medium and small enterprises. They became part of the world space industry by designing or constructing over 60 different instruments for experiments on more than 50 space missions, such as: ESA’s missions CASSINI (research on Saturn and its moon Titan), INTEGRAL (Gamma-Ray Astrophysics Laboratory), MARS EXPRESS (Mars orbiter), ROSETTA (comet mission), VENUS-EXPRESS (Venus orbiter), HERSCHEL, Bepi Colombo (mission to Mercury), Roskosmos’s KORONA-F, KORONAS –I, KORONAS-FOTON and Phobos-Grunt missions, and CNES’ DEMETER and TARANIS missions. Among the last ones, we should mention C-Dias system for Copernicus, AdRexp, MetOp – SG, Jupiter Icy Moon Explorer.¹

1 POLSA, Polish Space Sector, Catalogue of Entities, 2018 https://polsa.gov.pl/images/polski_sektor_kosmiczny_katalog_pl_eng/PODGLAD_PAK-KATALOG_EN_small.pdf, Access 15.02.2019; Malinowska K., Pole star is rising, Room Space Journal, October 2018.

The industry itself is very dynamic and self-organised, as the space enterprises' immediate response to Poland joining the ESA in 2012, was to set up the Polish Space Industry Association (SPACE PL), with the aim of creating favourable conditions for the creation of a strong Polish space industry that would be able to successfully compete on the European market. The organisation works alongside the state administration and international actors on a permanent basis, in 2014 becoming part of the international network SME4Space. Among the most important tasks set the by Space PL, is creating the conditions for the emergence of the new leaders of Polish astronautics.

Over the last five years, the attitude of the government is also changing. The Polish Prime Minister recently confirmed his plan to 'saturate the Polish economy with outer space elements', which goes together with the adoption of the Polish Space Strategy in 2017, covering the period 2017- 2030, providing for public funding aimed at accelerating projects of national satellite infrastructure.² This is followed by the National Space Programme for the years 2019 – 2021, adopted in November 2018. This can also be seen in projects accepted for financing by the National Centre of Research& Development. The problem to be faced by the Polish space industry in the near future is the perspective of shrinking the ESA's special support that the Polish entrepreneurs have enjoyed so far (the PLIIS programme and others). It means that the barely fledged Polish sector will soon be forced to compete on the market without counting on a protective public umbrella. The challenge of enabling them to adjust to the harsh market conditions should also lie on the shoulders of the Polish legislator.

2.2 Polish space thought

Poles have been gazing into outer space and analysing its mysteries since the times of the Polish astronomer Copernicus and his banned XVI century book *De revolutionibus orbium coelestium (On the Revolutions of the Heavenly Spheres)*. Now Copernicus has also lent his name to the European Programme for the establishment of a European capacity for Earth Observation, and we like stressing this connotation.

It should also not be forgotten that the Poles played an active part in setting out the foundations of the international space law by the United Nations. This important role was largely due to the pioneer of space law, Polish Professor Manfred Lachs, the first chairman of the COPUOS Legal Subcommittee of UNOOSA, whose name now serves as an award in most prominent space law competitions, such as Manfred Lachs Space Law Moot Court Competition and as a patron lending its name to various space law

2 Polish Space Strategy – adopted as an ordinance of the Council of Ministers dated 26 January 2017 (the text of the strategy has been published as an appendix to the resolution No 6 of 26 January 2017, Polish Monitor, item 203).

organizations and research centres. His words on space discoveries have become a proverb for contemporary space lawyers: *is it not true that we face here fascinating issues of law, a new world or worlds far beyond anything man has ever reached for?* In addition, while Polish engineering ideas can be found in various space missions, as an industry it has a long way to go in order to catch up with the more developed countries.

2.3 Law as a follower of industry needs

2.3.1. Polish space strategy and its legal implications

Poland has ratified four Space Treaties (excluding the Moon Agreement).³ This implies an obligation to adopt national space legislation. Work in this area was intensified in 2012 with Poland's accession to the European Space Agency, but it was only in 2017 that the draft law on space activities and the National Register of Space Objects was published, currently subject to the process of sectoral consultations. Today, Poland is still on its way to adopting comprehensive space legislation, which, apart from the statutory basis for the space agency, has barely reached the drafting stage. From the other side, there is no doubt that its subject and scope should be very carefully analysed and adapted to the needs of the industry, with its specifics, possibilities and potential.

While enacting a space law is undoubtedly an obligation of Poland as a state party to the Outer Space Treaty, more important is the fact that the legal regulations are a significant factor for structuring the national space industry in many aspects, also in the risk management process, both for the State, which is responsible for government and private space activities, but also for the national space industry as a whole.⁴ This is now very visible in discussions between the government, the Polish space industry and other sectors, such as insurance. The legal concept adopted in the national space law on managing the risk related to space projects may influence the development of the national space activity as a whole, especially given that it still suffers from a shortage of sufficient capital to bear the high level of risk related to ultra-hazardous activity such as space activity. Therefore, this

3 The Outer Space Treaty was ratified by Poland in 1968, (O.J. 1968, no 14, item 82); The Liability Convention in 1979, (O.J. 1979, No 6, item 35); The Rescue Agreement in 1969 (O.J. 1969, no 15, item 110); and the Registration Convention in 1976 (O.J. 1979, No 5, item 22).

4 S. Hobe, *The Impact of New Developments on International Space Law (New Actors, Commercialisation, Privatisation, Increase in the Number of "Space-faring Nations")*, *Revue de droit uniforme* 2010; R.L. Spencer, *International Space Law: Basis for National Regulation*, in: *National Space Regulation of Space Activities*, ed. Ram S. Jakhu, Dordrecht, Heidelberg, London, New York, 2010, p. 1; A. Soucek, *International Law in: Outer Space in Society, Politics and Law*, ed. A. Soucek, Ch. Brunner, Springer Wien New York, 2011, p. 342; *Renovating space: The future of international space law* PJ Blount - *Denv. J. Int'l L. & Pol'y*, 2011, p. 523.

aspect should be addressed with particular attention and be adjusted to the content of the space strategy, which, as mentioned, includes development of the satellite ground infrastructure and satellite data processing.

The international doctrine of space law, as well as UN soft law instruments, sets out some essential features of the national space legislation.⁵ These include the compliance of space law with the national space strategy and the need to ensure consistency between international space law and the national legal system. The draft of the Polish space law should be then analysed for its compliance also with the Polish space strategy. It assumes that the Polish space sector will be able to compete effectively on the European market, with turnover amounting to at least three per cent of the overall turnover of this market, that the Polish public administration will use satellite data for faster and more effective implementation of its tasks, and that domestic enterprises will be able to fully satisfy internal demand for such services and export them to other markets. It also assumed that Poland will have access to the satellite infrastructure to meet its needs, especially in the area of security and defence. The weakness of this strategy, as noted by some experts, is the discrepancy between its assumptions and reality, in particular as regards the lack of an upstream market, a relatively low level of public investment in the space sector, a lack of access to space funds and capital, a lack of awareness of the space potential among local authorities, a lack of cooperation between industry and scientific institutions, and the fact that the space sector is not seen as a priority.

This is not only a purely legal question, and answers must still be found, what type of activity to be included in the space law regime. The basics outlined by the Outer Space Treaty are obvious. The structure of the treaties, in particular the Outer Space Treaty and Liability Convention, shows that launch and satellite operations are the core activities regulated in the Space Treaties as consisting of the exploration of outer space.⁶ No special provisions included in the Space Treaties concern specific satellite services directly, which means that the application of the Treaties does not depend on the service being rendered, or the purpose for which a satellite is being used, but rather on the fact of launching or attempting to launch a satellite and its

5 General Assembly Resolution 68/74 of 11 December 2013 on recommendations on national legislation relevant to the peaceful exploration and use of outer space; see also Sofia Guidelines for a Model Law on National Space Legislation by *International Law Association* (ILA) 2012.

6 See also the review of the concept of the “launching State” Report of the Secretariat where it was stated that “The launching of objects into outer space, and sometimes also an attempted launch, is explicitly listed as a type of space activity under some national laws and is probably implicitly covered by most others” Committee on the Peaceful Uses of Outer Space Review of the concept of the “launching State.” http://www.unoosa.org/pdf/reports/ac105/AC105_768E.pdf. Accessed 26 August 2016, p.5

operation in outer space.⁷ There is little doubt that the international space regime does not encompass manufacturing. The shape of the Space Treaties differs from the industrial approach. The latter is visibly a broader one, qualifying all types of activities, such as launching, satellite operation, satellite manufacturing and satellite services (navigation/ observation / communication), as well as the perspective of suborbital flights as inherent parts of the space sector. The countries of emerging space sectors, especially those with limited capital resources, if they are attempting to join the world space family, they are facing an important dilemma of adopting an easy and minimalistic approach of the Space treaties or try to address these types of activities, which can be accessible for national entrepreneurs, who are very often nothing more than ambitious, unfledged start-ups. The list of activities under consideration certainly includes suborbital flights, down- and mid-stream sector, as well as such contentious issues as space mining.

In the legal situation of the EU (where there is a lack of harmonizing power in space due to Art. 189 TFUE), comparing a draft act on space activities with the legislation of other EU Member States seems to be of particular importance. Among them should be distinguished French law (because of the values of the Roman law culture, as well as the fact that EU states use the French spaceport in French Guyana) and the law of German tradition, represented by the Austrian and Dutch laws (due to the similarities of the German and Polish legal culture).

Choosing how space (and space-related) activity is regulated will have obvious implications in the sphere of the liability regime. The risk of causing damage and bearing liability requires a technological and legal approach, and both these aspects must be addressed in the space law. The national space law should then be perceived as a tool of managing the risk of space exploration.

2.3.2. Space law as a risk management tool

All activities undertaken in outer space are ultra-hazardous, inherently very risky and random⁸, with the possibility of causing damage not only to innocent bystanders, but also among the participants of the space operation. Space risks are associated primarily with “anything outside Earth’s

7 Smith L.J., Kerrest A., *Cologne Commentary*, vol. 2, Carl Heymanns Verlag, 2013, p. 114; Dunk F.G. von der, Europe and Security Issues in Space: The Institutional Setting, *Space and Defense*, Winter 2010) 4(1).

8 The notion of the ultra-hazardous activity has been outlined by the Prof C.W. Jenks in “Liability for ultra-hazardous activities in international law”, 1966 cited by Brodecki Z., *Liability in international law*, Studia Europejskie, Instytut Studiów Europejskich, Gdynia 2000, p.179; Parquet C_A, *Allocation of potential liabilities and risks in launch services agreements*, Project 2001 Plus workshop, 29-30 January 2004; also Soucek A., *International Law in: Outer Space in Society, Politics and Law*, A. Soucek, Ch. Brunner, Springer Wien New York 2011, p. 342.

atmosphere that can cause harm to people or property,”⁹ but the risk related to space operations is not limited to cosmic risks and also includes risks that can occur on Earth. The range of possible damage that may be sustained by property and persons includes the loss, damage or destruction of property related to the space project (i.e. satellite, launch vehicle, ground facilities), as well as the property of third parties, such as ships and aircrafts (in the event of a collision during the launch), or any other property in the event of a space object hitting the ground, increased by the consequential loss of profits and pure financial loss.¹⁰ Damage to persons includes manned space flights, persons involved in other way to the space activities (e.g. launch facilities staff), as well as innocent bystanders.¹¹ This has all been common knowledge since the beginning of space exploration.

The seriousness of the risks associated with space activity naturally entails a need to consider the specific allocation of the risk of damage, and thus this issue has been addressed in the Treaties, i.e. in the Outer Space Treaty (‘OST’) and then subsequently developed in the Liability Convention (‘LC’). The Outer Space Treaty sets the basic principles of liability for damage,¹² while the Liability Convention regulates specifically liability for damage caused by space objects. It provides for liability for damage caused at any time in the space object’s life, differentiating the principles of liability (absolute or based on fault) depending on where the damageable effects occur.¹³ The wording of the LC confirms its universal value and its victim-

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- 9 Ross S, *Risk Management and Insurance industry perspective on cosmic hazards*, in: Handbook of cosmic hazards and planetary defence, 2015, p. 2.
- 10 Blassel P., *Space projects and the coverage of associated risks*, The Geneva Papers on Risk and Insurance, Vol. 10, No 35, 1985, p. 72 – propose another division, distinguishing separately: loss of property, damage to property, failure to achieve the proper orbit, partial or total failure of satellite or payload and loss of revenues, while, according to the author, the above division includes damage as well as risk of the occurrence from which damage results; it means that they should not stand in line.
- 11 In total, over 200 people have been killed by rocket explosions. Apart from Challenger, the majority of the accidents causing death occurred on the ground during the ground processing of the launch operation or during re-entry; S.R. Jakhu, T. Sgobba, P.S. Dempsey (2011), *The need for an integrated Regulatory Regime for Aviation and Space*, p. 13.
- 12 Marboe I., Hafner F., *Brief Overview over national Authorization Mechanisms in Implementation of the UN International Space Treaties*, in: National Space Legislation in Europe, Martinus Nijhoff Publishers, Leiden/Boston 2011, p. 31; Dempsey P. S., *National Laws Governing Commercial Space Activities: Legislation, Regulation, & Enforcement*, Northwestern Journal of International Law & Business, vol. 36, 2016, pp. 7-9; A. Kerrest, *Liability for damage caused by space activities*, in: *Space Law: Current Problems and Perspectives for Future Regulation*, ed. M. Benkö, K.-U. Schrogl, D. Digrell, E. Jolley, Eleven 2005.
- 13 According to Article II of the LC, a launching state is absolutely liable to pay compensation for damage caused by its space object on the surface of the earth or to aircraft flight.

oriented approach, despite the fact that it has been applied only once since its adoption. It is important to note that the liability for damage is attributed exclusively to the state meeting the prerequisites of being the launching state, regardless of whether the damage was caused by the state or by nationals remaining under its jurisdiction. The rules of liability, as regulated in the Liability Convention, are an important basis for the shape of national regulations concerning the allocation of liability between the state – internationally liable – and the national space operators. A clear hint to regulate it can be derived from the OST, which imposes an obligation on the appropriate state to require authorisation and continuing supervision over the activities of non-governmental entities in outer space, and to exercise jurisdiction and control over space objects, and over any personnel, while in outer space. The treaties exclude liability for damage between the participants of the space mission (second party risks) from the regime, leaving it in the domain of the appropriate domestic legal regime.¹⁴

While there are many issues related to the national space legislation, managing the risk of damage seems to be one of the most important. Even only this one specific aspect raises several questions, making the legislative process turbulent from a political and legal point of view. And so it is in Poland. Firstly, what type of liability could and should be subject to national space law? Secondly, what types of entities in the industrial chain should be covered by the space liability regime under national space law? And thirdly, what risk management methods could be applied?

Considering the first question, it seems that managing the risk of damage that may be caused to innocent people (third party risk) as well as among the space mission participants (second party risk) is one of the most significant aspects of the national space regulation.¹⁵ Mentioning ‘risk management’ in a legal context means mainly shifting the liability borne by the State to the national space operators (and possibly to owners of the space objects). This, however, concerns only third party liability due to the provisions of the treaties,¹⁶ while the liability towards and between the parties involved in the space mission, as mentioned above, is not necessarily covered by this regime.

14 This is due to the wording of Article VIII of the Liability Convention, which, excludes the application of its provisions to damage caused by a space object of a launching State to: (a) Nationals of that launching State; (b) Foreign nationals during the time when they are participating in the operation of that space object from the time of its launching or at any stage thereafter until its descent, or during the time when they are in the immediate vicinity of a planned launching or recovery area as the result of an invitation by that launching State.

15 Masson-Zwaan T., *Liability & insurance in air & space law; Regulation of suborbital flights in Europe* – ICAO/UNOOSA Aerospace Symposium, Montreal Canada, 18-20 March 2015; Horl K. U., *Legal Aspects of Risks Involved in Commercial Space Activities*, Montreal 2003, p. 152.

16 Mainly due to the wording of the article VI OST.

Such risks nevertheless exist and affect the position of space entrepreneurs. Leaving the solution to the ‘invisible market hand’ and the general rules of liability regulated in the civil law is, of course, compliant with the OST, but may be an insufficient solution in those countries where, as in Poland, the space sector is in *statu nascendi*.

In most of the countries that have adopted space laws, the rules of liability for damage have been limited to those covered by the space treaties, regulating the liability for damage caused to third parties, while the liability between the space mission participants is left to the general provisions of law, supported by the industrial practice (which may even be called a kind of new *Lex Mercatoria*).¹⁷ It is based upon the contractual system of inter-party waivers of liability, accompanied by holding harmless clauses, and flow-down provisions, applied jointly. Applying such clauses naturally depends on the will of the contracting parties and their bargaining power. As such, they cannot be taken for granted, and produce a highly uncertain outcome of the disputes in that field.¹⁸

The other approach, presented by US and French law, expands the statutory regulation also to second party risks and provides for statutory obligation to apply the above waivers of liability into the contracts between the participants of space projects.¹⁹ It seems to play an important role in

17 A system of contractual clauses has been developed in this respect, corresponding with the organisational structure of the space mission, i.e. the launch and satellite operations including ownership issues, and contractual relations between all the parties involved in the launch activities; Masson- Zwaan T., *Liability & insurance in air & space law; Regulation of suborbital flights in Europe – ICAO/UNOOSA Aerospace Symposium*, Montreal Canada, 18-20 March 2015; See also Kayser V., *Launching Space Objects: Issues of Liability and Future Prospects*, in Space Regulations Library, vol. 1, Kluwer Academic Publishers, New York, Boston, Dordrecht, London, Moscow 2001. pp. 7-8.; on modern *Lex Mercatoria* see: Michaels, R., *The true lex Mercatoria, the Law beyond the State*, Indiana Journal of Global Legal Studies, vol. 14, No 2, 2008.

18 See the disputes: *Public Broadcasting Services v. Hughes Aircraft Company*, Case No. C.A 90 0736 (D. Cal. L.A., filed Feb. 19, 1990); *Martin Marietta Corporation v International Telecommunication Satellite Organization (Intelsat)*, 763 F. Supp. 1327 (D.Md. 1991), 991 F. 2d. (94th Circ. 1992); see also Meredith P. L., Robinson G. S., *Space Law: A case study for the practitioner. Implementing a Telecommunications Satellites Business Concept*, Martinus Nijhoff Publishers, 1992, 318, 265; Watson K.B., *Have the courts grounded the space launch industry? Reciprocal Waivers and the Commercial Space Launch Act*, *Jumetrics* 39, 1998; Masson-Zwaan T. L., *The Martin Marietta Case-Or how to Safeguard Private Commercial Space Activities*, *Air & Space Law*, Vol XVIII Number 1, 1993; C.A Parquet, *Allocation of potential liabilities and risks in launch services agreements*, Project 2001 Plus workshop, 29-30 January 2004.

19 Rakibi, *Les clauses reciproques d'abandon de recours et le garanties dans les contrats de l'industrie spatiale*, in: *Pratiques juridiques dans l'industrie aeronautique et spatiale*, (ed) P. Achilleas, W. Mikalef, 2014, p. 151 ; Clerc P., *The French Space*

diminishing the burden of the risk imposed on space entrepreneurs, limiting the need to insure difficult and expensive risks, as well as avoiding costly disputes between the parties to the space operations.²⁰

Then, however, questions are raised as to the circle of entities included in the space project, which may be encompassed by a system of liability waivers. Should it be only the launch and satellite operators, or also manufacturers? The issue may be resolved by defining the scope of space activity (as launch, operation and satellite exploitation, or also manufacturing), which will naturally establish the scope of entities included in the liability regime, or possibly by introducing a separate (narrower) circle of entities bound to obtain authorisation and a broader list of those that may be included in the liability regime (both as regards third and second party risk). The issue is not irrelevant in a country where there are no capacities to generate many satellite operators, and where the industry is focused on designing and manufacturing. The Polish legislator, therefore, faces the challenge of providing some legal incentives also for the designers and manufacturers, while at the same time combining the regulation with a sense of flexibility so as not to impose too burdensome impediments for the emerging Polish space industry when pursuing its outer space adventure, not only as a sub-contractor of component producers, but also when starting independent small satellite projects.²¹

The third issue touched upon as the subject of a lively discussion during the Polish legislation process is liability insurance of space risks. Certainly its subject and scope derives from the liability regime. Nevertheless, apart from that, there are at least certain specifically insurance law aspects where the discussion is still pending. While the subject matter of the coverage is limited only to third party liability insurance, regardless of the final shape of the liability regime (as discussed above), there are some concerns regarding the circle of entities to be covered by the insurance, i.e. whether it should be just the operator or also the State,²² as well applying the legal regime of compulsory insurance to space liability insurance. The latter issue only seems to be purely theoretical, but, as the insurance industry points out, it may have

Operation Act – one year of implementation, contribution au 6th Eilene M. Galloway Symposium on Critical Issues in Space Law. Proceedings of the International Institute of Space Law 2011 (Eleven International Publishing, 2012);

- 20 F.G. von der Dunk, *The Legal Framework for Space Projects in Europe: Aspects of Applicable Law and Dispute Resolution – Space and Telecommunications Law Program*. Faculty Publications 2011, p. 359.
- 21 T. Masson-Zwaan, *Registration of Small Satellites and the Case of the Netherlands in: Small Satellites: Regulatory Challenges and Chances*, Brill Academic Publishing, Leiden- Boston, 2016, pp. 189–191.
- 22 This will make difference in addressing the claim, *actio directa* regime, recourse action, etc. More on that subject Malinowska, K., *Space Insurance*. International Legal Aspects, Kluwer 2017, Chapter II, 2.02, 2.04.

practical effects concerning the possibility of arranging the insurance coverage. This is due to the legally restrictive character of the compulsory insurance in terms of coverage triggers (*act committed or claims made*), time frames of maintaining the insurance coverage and the possibility of the insurer rejecting the insurance application of the space operator due to high exposure. The above being only a fragment of a whole list of questions discussed between the insurance lawyers and space lawyers. In the status of the Polish space industry, insurance seems to be the only available tool of managing the space liability risk, so it cannot be illusory.

In the legal situation of the EU (where there is a lack of harmonizing power in space due to Article 189 TFUE), comparing a draft act on space activities with the legislation of other EU Member States seems to be of particular importance. Among them should be distinguished French law (because of the values of the Roman law culture, as well as the fact that EU states use the French spaceport in French Guyana) and the law of German tradition, represented by the Austrian and Dutch laws (due to the similarities of the German and Polish legal culture).

2.4. De lege ferenda suggestions

This picture leads to the fundamental question of how far the Polish space law should follow the guidelines issued by the UN in its minimalistic approach. Or whether it should rather take into account the fact that the Polish space sector consists of designers and manufacturers, and not launch operators. Similarly as with financial support, the enhancing role of the Polish state can serve to reduce the risk of potential liability.

The following suggestions could be considered during discussions on the Polish law.

Firstly, it could be advisable to define outer space in relation to the subject of the licensed space activity, also in order to state whether such activity includes suborbital flights. In this respect, the arguments for a spatial approach should be shared, indicating the difficulty of defining functional space activities without reference to spatial criteria due to, for example, technological changes in the art of construction of space objects. As a result, it seems desirable to indicate the regime applicable to suborbital flights, and if these are excluded from the space law regime, then a clear regulation of this issue in the air law. The above is important for clarifying the scope of the space law regime for licensing purposes and for the liability regime.

Secondly, it seems reasonable to formulate precisely the principles of liability for damage to third parties, in such a way that liability is clearly related to the exercise of space activities, not only to the space object.

Thirdly, it would be reasonable, following the example of French legislation, to consider whether the manufacturers of space objects (most of the Polish space industry) could be included in a regime of limited liability for damage.

Fourth, it is necessary to specify the time of liability (e.g. by reference to the completion of activities specified in the license), so that it does not give rise to doubts in the context of its insurance; following the example of French law could be considered in this respect.

Fifth, it seems justified to identify the circle of entities with an insurance interest in compulsory third party liability insurance, and to identify them as insured together with the (launching) state, which is the widespread practice in national laws. In the context of the postulate that manufacturers could be subject to limited liability, they should also be in the circle of the insured entities.

2.5. Conclusions

Regulating matters related to the exploration of space is an extremely difficult task, even having good examples of European national laws, and models of such laws developed by the ILA and the UN. Such a law must be almost as dynamic as the space ventures themselves. Therefore, on the eve of Poland's adoption of its own space law, a broad social and legal debate is now being maintained. It includes not only space law experts, but also those from the fields of civil law and insurance, as well as, even more importantly, experts on space technologies and satellite techniques. Only such an interdisciplinary discussion gives a chance for a consistent legal regulation corresponding not only to legal standards, but also to the needs and tasks of the Polish space industry. It seems that it would be a mistake to stop at regulations reflecting the current state of technology and the space sector in Poland, while there is a debate around the world about the concept of regulating such issues as space mining or suborbital flights.

The great acceleration of changes in the field of space technologies and satellite techniques, which we have been observing since the beginning of the 21st century, has had a major impact on the market and culture. Perceiving the law in interaction with the market and culture has become one of the most important challenges for the legislators. This is now evident during the work on the draft of the Polish act on space activities and the national register of space objects, as well as other new laws to be adopted by emerging space nations.