

Legal Aspects of Insurance Regarding Space Activities and the Situation in China: an Analysis Based on the New Development of Space Commercialization

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I . Introduction

Compared to the other aspects, space insurance can not be concerned as a new frontier relating to space commercial activities. As early as 1965, the first satellite insurance was placed with Lloyd's of London to cover physical damages on pre-launch for the "Early Bird" satellite Intelsat I.¹⁾ The coverage of this insurance refers to only the physical damages on pre-launch phase, and the liability of the insurer is limited. However, this could be admitted as the starting-point of insurance in space activities, which is significant to promote the development of space commercialization.

Following the successful practice in 1965, coverage was arranged for pre-launch and launch perils for the Intelsat III satellites in the year 1968.²⁾ After that, for more than 50 years' development, the insurance regarding satellite launch today including the phases of pre-launch, launch, in-orbit, etc. According to the general introduction of an insurance broker company, the key space and satellite insurance coverages can be basically divided into the areas such as: satellite launch and in-orbit insurances, launch risk guarantee, satellite launch vehicle flight only insurance, satellite post-separation insurance, satellite in-orbit insurance, facultative space reinsurance, satellite transit and pre-launch insurance and satellite loss of revenue insurance etc.³⁾ It seems that the insurance relevant to the satellite is pretty comprehensive developed on the international plane. In

1) More information regarding the first satellite insurance can be found in: Gabriella Catalano Sgrosso, *Insurance Implications about Commercial and Industrial Activities in Outer Space*, in Proceedings of the 36th Colloquium on the Law of Outer Space, Graz, 1993, p. 187. See also: Ruwantissa Abeyratne, *Space Security Law*, Springer 2011, pp. 66-67.

2) More information is available at: <https://en.wikipedia.org/wiki/Satellite_insurance> last accessed 20 May 2017.

3) See the general introduction of space and satellite insurance on the official website of the Marsh company, available at: <<https://www.marsh.com/uk/industries/aviation-aerospace/space-and-satellite-insurance.html>> last accessed 20 May 2017.

addition to satellite insurance, there are also other space fields of relevance to insurance. For instance, the insurance to the astronauts and the third party liability insurance.

A purchaser of satellite insurance is intends to guarantee the benefits of the participants in commercial activities regarding satellites launching etc. On the astronaut insurance, the special protection of the “envoy of mankind”⁴⁾ is necessary in any case. Moreover, the Rescue Agreement also creates an international regime to assist the astronauts who are in danger.⁵⁾ The third party liability insurance is established as a precondition to receiving a permit for space launch in many domestic space regulations,⁶⁾ and from this point of view, when launching satellites, a third party liability insurance is also required.

Generally speaking, the insurance market, especially which is relevant to the satellite insurance, is well developed. About 430 commercial satellites are operating in orbit in the year 2016, and over 250 were insured.⁷⁾ Concerning that with a total over 560 commercial satellites are anticipated to be launched in the next decades,⁸⁾ the rapid development of the satellite insurance market can be imagined. A statistic shows that the space insurance industry generates around USD 750 to USD 800 million a year,⁹⁾ however, because the satellite industry

4) With respect to the specific analysis of the definition of “envoy of mankind” see: Frans Gerhard von der Dunk, Gerardine Meishan Goh, *Art. V of Outer Space Treaty*, in Hobe, Schmidt-Tedd, Schrogl (eds), *Cologne Commentary on Space Law*, (Volume I), Carl Heymanns Verlag, 2009, p.98.

5) More information regarding the Rescue Agreement, see: Hobe, Schmidt-Tedd, Schrogl (eds), *Cologne Commentary on Space Law*, (Volume II), Carl Heymanns Verlag, 2013, pp. 1-82.

6) See David Sagar, *Compulsory Insurance: Basic Features of National Insurance Regulations*, in Stephan Hobe, Bernhard Schmidt-Tedd, Kai-Uwe Schrogl (eds.), *Project 2001 Plus: Global and European Challenges for Air and Space Law at the Edge of the 21st Century-Towards a Harmonized Approach for National Space Legislation in Europe*, Proceedings of the Workshop, 29/30 January 2004, Berlin. pp. 1-13.

7) Aon Risk Solutions, *Insuring Space Activities*, October 2016, p.4.

8) Ibid.

9) OECD (2011), *Insurance market for space activities*, in *The Space Economy at a Glance 2011*, OECD Publishing, Paris.

revenue was 208.3 billion USD in 2015,¹⁰⁾ the annual benefits of the space insurance industry will accordingly increase.

From the perspective of law, some new issues are deserved to be addressed against the background of the development of space privatization and the participation of international commercial space activities by many new space faring countries, for example, China. For discussing the regulation of space insurance to response the new development of space commercialization and privatization, this research will respectively focus on the satellite insurance, the insurance of astronauts and the third party liability insurance. Accordingly, the situation of the new commercial space- faring country, i.e., China (P.R) will be mentioned as an example.

II . The satellite insurance and the development of space privatization

1. The development of satellite insurance and the present status in China

As indicated, the global satellite insurance market is well developed, and the benefits are earning from this insurance are becoming more and more considerable according to the rapid development of space industry, especially satellite industry.

After established in 1980, the Chinese Great Wall Industry Corporation (CGWIC) which is fully owned by the Chinese Government, is the only authorized enterprise that can provide launching services to the other countries.¹¹⁾

10) *State of the Satellite Industry Report*, June 2016, available at: <<http://www.sia.org/wp-content/uploads/2016/06/SSIR16-Pdf-Copy-for-Website-Compressed.pdf>> last accessed 20 May 2017.

11) With respect the general introduction of the CGWIC, see: <<http://cn.cgwic.com/index.ht>

After the development about 40 years, the CGWIC is at present a company that can “meet customers’ multi-directional needs by providing comprehensive solutions for commercial launch services, satellite export, satellite ground tracking and control station construction, satellite applications, project financing, project insurance and technical training, etc.”¹²⁾ From this point of view, one can see that “project insurance” is not a barrier for the CGWIC to conduct business. And the essential factors of satellite insurance in China are summarized as followed:

Firstly, the basic types regarding satellite insurance that can be purchased in China are similar to the practices of the global market and can be summarized as the “pre-launch insurance”, the “launch insurance” as well as the “in-orbit insurance”.

More specifically, the pre-launch insurance is mostly concerned as a “property insurance”, and the coverage refers to the satellite itself, the launch vehicle, the property belonging to the launching site and the other assets which are of relevance to the launching activity. The period of the pre-launch insurance starts at the time when the satellite is on board to the launch site and ends when the spacecraft is docked with the rocket.¹³⁾ The pre-launch phase is recognized as facing the lowest risk in the entire process of launching space objects, so the premium rate is always calculated according to 0.01%-0.05% of the total value of the insured properties.¹⁴⁾

The launch insurance insures the risk that happens in the launching phase, which is a period from firing the first stage of the rocket to launching the satellite into the pre-selected orbit.¹⁵⁾ If the satellite is damaged or out of control in this period, or the satellite is not launched into the orbit, the insurer is liable to pay

ml> last accessed 20 May 2017.

12) The basic information concerning the businesses of CGWIC is available at: <<http://www.cgwic.com/About/index.html>> last accessed 20 May 2017.

13) More information regarding Chinese satellite insurance can be found at: <<http://business.sohu.com/20161017/n470514497.shtml>> last accessed 20 May 2017.

14) Ibid.

15) Ibid.

for the damages. The premium rate of the launch insurance is created by considering the reliability of the launch vehicle, the success rate of the launch entity's previous activities and other relevant factors.¹⁶⁾

After successfully operated, an in-orbit insurance of the satellite which will last for 1 to 3 years is always demanded, and 1.2% of the value of the insurance subject will be charged as premium.¹⁷⁾

In addition to the major types of satellite insurance in China, another critical factor that is of relevance to the development of China's satellite industry or even the space industry is the companies that are authorized to provide the insurances mentioned above.

In the mid of the 1990s, satellites launched by China are usually insured by foreign companies, Chinese insurance companies only underwrote in an amount of 3% in a launch activity. However, after the several launch accidents in 1996,¹⁸⁾ the China's Long March Series rockets started to be doubted by the insurance companies on the international market. To create a reliable protection to Chinese satellite industry, the "China Aerospace Insurance Association (CAIA)" was established under the support of the People's Bank of China and the Chinese Ministry of Finance in the year 1997.¹⁹⁾

The CAIA is in essential a union of several Chinese insurance companies, and the China's biggest insurance company, i.e., the People's Insurance Company of China Limited (PICC - a government-owned company) plays the major role in the association.²⁰⁾ The PICC, as well as the other participants of the CAIA (such as the China Pacific Insurance Company and the China Pingan Insurance

16) Ibid.

17) Ibid.

18) With respect to the Chinese space accident in 1996, see: <<http://news.nen.com.cn/system/2016/02/19/018877908.shtml>> last accessed 20 May 2017.

19) See the introduction on the official website of China Aerospace Science and Technology Corporation, <<http://www.spacechina.com/n25/n144/n206/n220/c403299/content.html>> last accessed 20 May 2017.

20) With respect to the PICC, see: <<http://www.picc.com.cn/html0/folder/0/4295-1.htm>> last accessed 20 May 2017.

Company, etc.) intend to create a fund for China's future launch of satellites. And the primary business of the CAIA is to provide insurance to Chinese space activities, especially activities relevant to satellites launch.

On the other hand, for the participants of space activities, to purchase insurance from CAIA is a mandatory obligation before conducting specific activities, for example, launching a satellite or a space object. Moreover, for a long time, the CAIA was the only entity that can provide satellite insurance. In other words, the satellite insurance market in China used to be monopolized.²¹⁾ However, the monopoly was broken with the adoption of a new policy by China Insurance Regulatory Commission in 2004.²²⁾ After that, entities involved in launching satellite can choose other qualified companies to purchase insurance.

In sum, the types of satellite insurance in China are at present comprehensive, and many companies are qualified enough to provide an adequate amount of insurance for the relevant entities of a satellite launch. However, it is necessary to notice the fact that, the satellite insurance market in China is created according to the practices of governmental launch activities, whether the present regime can be directly applied to private sectors deserves to be discussed further.

2. The participation of private sector in launching service of satellites and its challenge to insurance

In the year 1997, private sector space revenues exceeded governmental space expenditures for the first time, and the number of commercial payloads launched into outer space exceeded the number of government payloads.²³⁾ Thereafter, more and more private entities started their businesses of providing launching

21) See: <<http://www.spacechina.com/n25/n144/n206/n220/c403299/content.html>> last accessed 20 May 2017.

22) Ibid.

23) James A. Vedda, *Space Commerce*, in Eligar Sadeh (ed.), *Space Politics and Policy: an Evolutionary Perspective*, Kluwer Academic Publishers, 2002, p. 215.

services of satellites, etc. Many new space-faring states also announced their plans to provide commercial launch services.

For example, the CGWIC. For a long time, this governmental-owned company is the only qualified corporation to provide launching services in China, especially in the field of providing international launching services.

The first Chinese privately-owned launching company (Linker) was established in July 2014 in Beijing by three Chinese young people. The first order for launching a sounding rocket was received soon after its establishment.²⁴⁾ Although the launch of a sounding rocket is not under the jurisdiction of the legal measures regarding outer space in China, it is a good start for space privatization.²⁵⁾

From 2015, more and more Chinese private entities began to get involved in conducting businesses relevant to satellites (these businesses include many aspects and several creative fields were developed),²⁶⁾ and it is anticipated that the private sector in China can provide services related to satellites for national and foreign customers in the future.

However, as indicated above, the present regime of space, as well as satellite insurance in China is created based on the practices of Chinese governmental-owned company, especially the CGWIC. Whether the same standards for purchasing satellites insurance can be applied to a private entity is in doubt, particularly in the primary stage of Chinese space privatization. After 2004, Chinese business-people involving in satellite industry can choose to get insured from the governmental controlled CAIA or a domestic insurance company. The marketization operation of satellite insurance offers more opportunities to developing private satellite activities, however, to find a “national insurance company” as the lead insurer is a precondition

24) *Chinese First Private Rocket company Received Her First Oder Form, the Founders are the Generation after 90s*, more information is available at: <http://china.cnr.cn/xwwgf/201407/t20140728_516055235.shtml> last accessed 18 May 2017.

25) Mingyan Nie, *Legal Framework and Basis for the Establishment of space cooperation in Asia*, Lit Verlag GmbH& Co. KG, 2016, p. 65.

26) Yongchun Zheng, 2015 as the First Year of an Era of Commercial Space in China, available at: <http://www.chinafeatures.com/zt/zyc/201511/t20151113_30185.html> last accessed 20 May 2017.

for a private satellite activity.

Given this, to promote the development of space privatization, proper measure need to be taken to improve the existing mechanism of Chinese satellite insurance. Considering that the satellite insurance market itself also has tremendous commercial potential, the improved insurance mechanism of satellite is demanded to meet the needs of developing China's private space activities as well the requirements of the other foreign customers in the international market.

3. Legal measures can be taken by China: for the purpose of promoting private space activities

Noticing the fact of the rapid development of space privatization and commercialization in China in recent three years, the year 2015 is defined by scholars as the "primary era" of Chinese Commercial Space".²⁷⁾ Many private companies started their businesses in relevant to space affairs, and the activities regarding satellites occupy a considerable proportion of all the businesses.

The present section of this research focuses on the measures to improve the insurance mechanism of space activities in China, and the final purpose is to encourage the participation of private entities in space activities, especially satellite industry. Meanwhile, the promotion of the development of Chinese insurance companies to get the capacity to provide insurance for foreign customers is under consideration. So in the following paragraphs, the particular situation of the Chinese private space actors as well as the international satellites insurance market will be concerned.

Firstly, the space industry which is sponsored by the government is well-developed in China. Since April 1970 when China became the fifth country to successfully put its satellite (Dongfanghong-I) into orbit, to date, following

27) Yongchun Zheng, *2015 as the First Year of an Era of Commercial Space in China*, available at: <http://www.chinafeatures.com/zt/zyc/201511/t20151113_30185.html> last accessed 20 May 2017.

more than 40 years of development, China's space program is distinguishable as it has a full range of capacities typically found only in the context of developed space actors.²⁸⁾ Meanwhile, many space policies were created to support the smooth development of Chinese space industry, one of which is the establishment of the CAIA. Compared to the governmental programs in space, the development of the private/commercial space projects in China is just at the beginning. Against the background of the global competition of space affairs, relevant supports from the government to private space actors are indispensable. From the perspective of insurance, the governmental-controlled CAIA is recommended to provide some preferential policies to the private space activities. For example, to create a special fund for specific qualified private entities, etc.

As shown in the practice of many private satellite companies, in the beginning, most of them will choose to develop businesses in relation to the satellites directly, in other words, these companies will depend on the launch vehicles belonging to the government. Even if some entities is intending to develop launch vehicles (for example the Linker company introduced above), it will take a long time for them to provide service independently. Concerning the insurance, the insurer is only demanded to consider the standards of insurance regarding the phase of "in-orbit", the pre-launch and the launch phases can be insured following the same criteria as the governmental program.

Moreover, at the present stage, many private companies are emphasizing developing mini-satellites. Compared to normal satellites, mini-satellite is characterized as lower cost and risk, which is an excellent opportunity for the CAIA to create favorable policies to the private entities. In a word, for the purpose of supporting Chinese space privatization from the perspective of improving insurance regime, the CAIA, which is a governmental-owned satellite insurer, is only recommended to coordinate the policies of "in-orbit" insurance, and most of these insurances are aiming to protect mini-satellites.

28) Robert C. Harding, *Space Policy in Developing Countries: the Search for Security and Development on the Final Frontier*, Routledge, Taylor&Francis Group, 2013, p. 86.

Secondly, for the other insurance companies, there will be more opportunities for them to ensure the private space activities, including activities regarding satellites. For supporting them, measures relevant to develop the regime of the insurance broker in space affairs is suggested to be taken.

The regime of insurance broker plays a very significant role in many fields of insurance, among other things, space insurance. Generally speaking, the insurance broker acts as an intermediary agent. With respect to insurance brokers in space areas, they are demanded to acquire enough knowledge of both insurance and space technologies. However, for a long time, the regime of the insurance broker in the fields of space was ignored in China. In 2001, the CAIA even made a decision to announce not to apply the mechanism of insurance broker into satellite insurance businesses for the time being.²⁹⁾ And this decision was changed by the practice of the FY-2C satellite in the year 2004. The Chinese Jiangtai Insurance Brokers Co, Ltd,³⁰⁾ which is the first Chinese insurance brokers company dealing with general affairs, got the permit from the China Insurance Regulatory Commission to act as the insurance broker to involve in the insurance cases regarding the launch of the FY-2C satellite.³¹⁾ After that, insurance brokers regarding space as well as satellite industries started to be promoted. However, up to date, it is hard to say that a comprehensive regime relevant to space insurance brokers has been created in China. The lack of specialized knowledge is still the main barrier for most insurance brokers companies to get involved in this field.

With the rapid development of space privatization, it is anticipated that more companies of insurance brokers will be qualified to involve in the appropriate space insurances. In the meanwhile, legal measures which can confirm the steady development of space insurance brokers are required.

29) Jie Liu, *The role Played by Insurance Brokers in Chinese Aerospace Insurance Market*, in *Aerospace China*, July 2005, p. 14.

30) More information about the Jiangtai Insurance Brokers Corporation, see: <<http://www.jiingtai.com/jtbx/p/Index.html>> last accessed 20 May 2017.

31) Jie Liu, *The role Played by Insurance Brokers in Chinese Aerospace Insurance Market*, in *Aerospace China*, July 2005, p. 14.

III. The insurance to astronauts and the emerging orbital / suborbital tourism

Art. V of the Outer Space Treaty (OST) addresses that “space parties to the Treaty shall regard astronauts as envoys of mankind in outer space and shall render to them all possible assistance in the event of accident, distress, or emergency landing on the territory of another state party or on the high seas [...]”.³²⁾ And this principle was further interpreted and regulated in the 1968 “Astronaut Agreement (ARRA)”.³³⁾ In general, as the envoys of humankind, astronauts are protected by the international treaties, at the same time, as employees of the relevant governments, the rights of astronauts will be basically protected by national laws.

Governments will always provide different types of insurances to them. However, the recent development of space tourism especially the sub-orbital tourism proposes a question about the legal status of the space tourists. Accordingly, the insurance regime to those “Spacemen” is deserved to be emphasized.

1. Rescue and insurance of astronauts and the present situation in China

It is believed that one of the purposes of the Astronaut Agreement is to safeguard the lives of the brave pioneers of outer space travel under the basic precepts of the humanitarian law.³⁴⁾ Accordingly, duties for the contracting states

32) Art. V of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, London/Moscow/Washington, done 27 January 1967, entered into force 10 October 1967; 610 UNTS 205; TIAS 6347; 18 UST 2410; UKTS 1968 No. 10; Cmnd. 3198; ATS 1967 No. 24; 6 ILM 386 (1967).

33) Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, Adoption by the General Assembly: 19 December 1967 (resolution 2345 (XXII)), Opened for signature: 22 April 1968 in London, Moscow and Washington, D.C. Entry into force: 3 December 1968.

of the Astronaut Agreement, as well as the Outer Space Treaty are required to be performed for rescuing astronauts. And this fundamental legal principle has been accepted by nearly all members of the relevant international space treaties.

In addition to the regulations created by the ARRA and the OST, for safeguarding the astronauts, the relevant governments will always purchase insurance for the cosmonaut before a launching target.

Take the situation in China as an example. The first Chinese astronaut, Yang Liwei was successfully launched and returned by the Shenzhou-V vehicle in the year 2003.³⁵⁾ Accordingly, the insurance regime to astronauts was developed. The Insurance Corporation of China Life³⁶⁾ concluded an agreement with the Astronaut Center of China to provide insurance to astronauts, and a new type named “Astronauts Group Insurance (life insurance)” was established.³⁷⁾ Under the framework of this kind of insurance, distinguished coverage levels are shown in the different phases of an astronaut involving in space activities. More specifically, the insurance coverage is in an amount of 1 million RMB for safeguarding the daily life and routine training of an astronaut, and if an astronaut is assigned to prepare for a flight target, this number rise to 2 million.

A total amount of 5 million RMB will be received by an astronaut as insurance if she/he participates in a launching mission.³⁸⁾ Moreover, the spouse and children of an astronaut are also covered by the “Astronauts Relations Group Insurance (life insurance)”, and the coverage reaches to 500 thousand (for the spouse) and 100 thousand (for a child).³⁹⁾ Beyond that, the other insurances that are required

34) Mark. J. Sundahl, *Rescuing Space Tourists: a Humanitarian and Business Need*, in Proceedings of the 50th Colloquium on the Law of Outer Space, Hyderabad, India, 2008, p. 210.

35) More details of China Manned Space Flight, see: <<http://www.cmse.gov.cn/col/col1493/index.html>> last accessed 20 May 2017.

36) See: <<http://www.chinalife.com.cn/publish/zhuzhan/index.html>> last accessed 20 May 2017.

37) More information of Chinese Astronaut insurance, please see: <<http://news.vobao.com/news/global/760548515111.shtml>> last accessed 20 May 2017.

38) Ibid.

39) Ibid.

to be purchased by Chinese “Labor Law” apply to the astronauts.

In brief, it seems that a comprehensive system of insurance is created to protect the benefits of astronauts. Moreover, one can see that national regulations of China intend to protect the astronauts who are employed by the government. In other words, the benefits concerning the passengers of commercial spaceflight need to be ensured by another regime of insurance.

2. Legal status of space/suborbital tourist and the relevant insurance

The primary legal challenge brought by the space tourism is firstly noticed by scholars of international law. A major controversy is relevant to the legal status of the space tourists. Some believe that they should be treated as astronauts, and the ARRA should be equally applied to them.⁴⁰⁾ On the contrary, some researchers focus on the differences between space tourist and astronaut and intend that space tourist is different from astronaut essentially.⁴¹⁾ Nevertheless, for the legal status of the space tourist, it is agreed that “private persons and non-governmental entities can be held to be the beneficiaries of contemporary and future space effort under the world rule of law”.⁴²⁾ In other words, under the framework of public international law, space tourist should be rescued in case of accidents according to the regulation of the ARRA. However, when it refers to the sub-orbital tourists, there are new arguments regarding their legal status.

The journey of a suborbital tourism can be divided into different stages. So

40) Bin Cheng, “Space Objects”, “Astronauts” and Related Expressions, in Proceedings of the 34th Colloquium on the Law of Outer Space, Montreal, Canada, 1992, p. 17, 25.

41) I.H. Ph. Diederiks-Verschoor, *Search and Rescue in Space Law*, in Proceedings of the 19th Colloquium on the Law of Outer Space, Anaheim, USA, 1977, p. 152, 156. See also: Mark. J. Sundahl, *Rescuing Space Tourists: a Humanitarian and Business Need*, in Proceedings of the 50th Colloquium on the Law of Outer Space, Hyderabad, India, 2008, p. 207.

42) I.H. Ph. Diederiks-Verschoor, Paul. Gormley, *The Future Legal Status of Non-governmental Entities in Outer Space: Private Individuals and Companies as Subjects and Beneficiaries of International Space Law*, in *Journal of Space Law*, 1977, vol. 5, p. 155.

some announce that during the period of a sub-orbital flight, the vehicle operates as an aircraft for the first stage of the trip as it does in fact 'derive support from the reactions of air', but in the other stages of trip, the vehicle falls under the status of 'space object' as it can only operate on rocket-mode propulsion.⁴³⁾ Therefore, air law applies to the space vehicle before detachment and the mother ship after the separation, and space law applies to the object which operates on rocket-mode propulsion after separation.⁴⁴⁾

Whereas several authors point out that a space object refers to any vehicle intended to be active in outer space,⁴⁵⁾ and the commercial suborbital flights offered by space travel agencies fall under this general classification. As the terms they use in their advertisements, such as space tourism, space travel and space flight, illustrate their obvious purpose of the flight.⁴⁶⁾ The different understandings regarding the legal nature of a commercial suborbital flight determine the application of laws. And the direct results of this different applications are the different liability/responsibility of compensation and registration of the launching agencies.

Concerning that the present research focuses on the insurance, precise analysis of compensation and registration will not be made. However, it is necessary to notice the fact that, a sophisticated regulation regarding the liability/responsibility of compensation and registration can serve as a legal precondition for the suborbital commercial flight providers to deal with the issues about the insurance of the tourists.

43) Frans G. von der Dunk, *Passing Buck to Rogers: International Liability Issues in Private Spaceflight*, in *Nebraska Law Review*, 2007, vol. 86, p. 432. See also: Yanal Abul Failat, *Space Tourism: a Synopsis on its Legal Challenges*, in *Irish Law Journal*, 2012, vol. 1, p. 148.

44) Juergen Cloppenburg, *Legal Aspects of Space Tourism*, in Marietta Benkoe, Kai-Uwe Schrogl (eds.), *Space Law: Current Problems and Perspectives for Future Regulation*, Eleven International Publishing, 2005, p. 91-104. See also: Yanal Abul Failat, *Space Tourism: a Synopsis on its Legal Challenges*, in *Irish Law Journal*, 2012, vol. 1, p. 148.

45) Henri A. Wassenbergh, *Principles of Outer Space Law in Hindsight*, Martinus Nijhoff Publishers, 1992, p. 52.

46) Stephan Hobe, *Legal Aspects of space Tourism*, in *Nebraska Law Review*, 2007, vol. 86, p. 444.

For dealing with the issues of liability between the passengers and the companies providing services of space tourism, the federal law of the United States requires space tourists to provide a signed waiver of any damage or loss caused during the space flight.⁴⁷⁾ Furthermore, federal law requires the completion of an informed consent form containing a declaration that the space flight participants recognize that risks including death and injury are involved in the journey and that their participation is voluntary.⁴⁸⁾ This regulation is evaluated as favoring the operator only,⁴⁹⁾ so some researchers proposed to replace the informed consent system by compulsory insurance.⁵⁰⁾

In conclusion, the American legislation regarding commercial space passengers is established to facilitate the development of the space operators. Even if the opinion of purchasing a compulsory insurance by the tourists is proposed, the protection of their benefits during the space flight depends much on the confidence of the insurance companies regarding the extent of the risks involved with the new emerging services of space tourism.⁵¹⁾ Considering that the legal status of the suborbital tourists is still controversial on the international plane, relevant domestic legal measures are recommended to be taken by the states that are intending to develop the business of space travel.

47) Terry L. Hardy, *Risk Perception and Communication in Commercial Reusable Launch Vehicle Operations*, available at: <https://www.faa.gov/about/office_org/headquarters_offices/ast/media/Q4_05_QLR.pdf> last accessed 20 May 2017. See also: Yanal Abul Failat, *Space Tourism: a Synopsis on its Legal Challenges*, in *Irish Law Journal*, 2012, vol. 1, p. 146.

48) Code of Federal Regulation, section 460. 45(f). Comes from: Yanal Abul Failat, *Space Tourism: a Synopsis on its Legal Challenges*, in *Irish Law Journal*, 2012, vol. 1, p.146, footnote 203.

49) International Institute of Air and Space Law Leiden University, *Report Symposium on the Regulation of Sub-orbital Flights in the European Context*, September 2010, available at: <<http://media.leidenuniv.nl/legacy/final-report-symposium-16-september-2010.pdf>> last accessed 20 May 2017.

50) *Ibid.*

51) Yanal Abul Failat, *Space Tourism: a Synopsis on its Legal Challenges*, in *Irish Law Journal*, 2012, vol. 1, p. 144.

3. Legal measures can be taken by China: for promoting the development of Chinese space tourism business

The first space tourist Dennis Tito paid 20 million dollars for visiting the International Space Station in 2001.⁵²⁾ For space travelers like Mr Dennis Tito, who are affordable to millions of dollars for travel, it is not difficult to get insurance, which may cost very high premium, from an insurance company. However, for the purpose of developing the business of space tourism, the present situation is demanded to be changed.⁵³⁾ On the one hand, the rapid development of space technology has already provided the possibility of conducting a low-cost suborbital travel. Accordingly, appropriate insurance mechanism that is in favor of promoting the participation of travelers needs to be created on the other hand.

From the perspective of law, it is recommended that after the adoption of the Chinese space law in 2020,⁵⁴⁾ a regulation concerning commercial space activities is to be made. And the issues regarding space tourism and insurance should be regulated. Unlike the U.S federal law, it is recommended that this Chinese legislation takes the purchase of insurance as a precondition for a tourist to start her/his space travel. And concerning the legal status of the suborbital travelers, it is suggested that this regulation confirms the possibility of its application to these travelers but not to define their legal nature. Once the special international regime for space tourism is created, and the legal status of different kinds of travelers are clarified in the future, the Chinese regulation can be amended accordingly.

It is anticipated that the space travel company in China will be sponsored by China National Space Administration (CNSA) or other relevant governmental

52) Annemarie Rencken, Have a Safe Journey to the Stars, November 10th 2016, available at: <<https://www.allianz-jobs.com/2016/11/10/space-insurance/>> last accessed 20 May 2017.

53) Until 2009, only seven different - and extremely wealthy - people had booked a trip via the private spaceflight company Space Adventures with the Russian space capsule Soyuz to the ISS. Ibid.

54) More information about the making of Chinese space regulation in 2020, see: <<http://www.chinanews.com/fz/2014/11-17/6784252.shtml>> last accessed 20 May 2017.

departments at the beginning, and the public vehicles will be used. Therefore, all standards of insurance which apply to the astronauts can be equally provided to the tourists. The only difference is that the tourists themselves should pay the premium here. Of course, it is important to notice the fact that not every item included in the “Astronauts Group Insurance” will be suitable for the commercial passengers, so the insurance company is advised to give the passengers rights to choose a proper type of insurance.

The suborbital travel will be a real challenge to the Chinese insurance company. Since the suborbital flight is a field that can be developed by private enterprises. If private suborbital flight providers are created in China, in the beginning, insurance quotes are difficult to calculate due to the limited statistical information available.⁵⁵⁾ This will result in the failure of the business in this field. Or the Chinese private enterprise can also arrange their customers to get insured from a foreign company which has enough experiences in this area. Regarding this issue, it is believed that if the national controlled space tourism corporation is established and operated regularly, and the insurance regime is well developed, the commercial suborbital traveler can be reasonable insured.

IV. The third party liability insurance and the necessity for its harmonization to meet the demands of commercial space cooperation

Provisions which are relevant to the third party liability insurance is commonly accepted as indispensable in a domestic space regulation. In general, to purchase

55) Patrick Collins, Koichi Yonemoto, *Legal and Regulatory Issues for Passenger Space Travel*, in Proceedings of the 41st Colloquium on the Law of Outer Space, Melbourne Australia, October 1998, p. 224.

an insurance of third party liability is confirmed as a precondition for the applicant to get the permission of a launch activity. The “Draft Model Law National Space Legislation” published by the International Law Association (the ILA Model Law) also confirms this idea.⁵⁶⁾ Meanwhile, it is necessary to notice the fact that, in many national legislations, the applicant of launch permit is allowed to prove their financial capacity to exempt the obligation of obtaining a third party liability insurance. Against the background of private space cooperation, many states, especially the European countries start to discuss the possibility of harmonizing the clauses in domestic laws, and the third party liability insurance provisions are taken into consideration.

1. Third party liability insurance regulated in domestic space law and the practice in China

Art. VI OST stipulates that “States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the moon and other celestial bodies, whether such activities are carried on by governmental agencies or by non-governmental entities [...]”⁵⁷⁾ And this basic principle is further illustrated in the 1972 Liability convention (LIAB).⁵⁸⁾ According to the regulations of OST and LIAB, states are liable for the damages to the third parties caused by space activities of non-governmental entities under their jurisdiction.

For the purpose of protecting the national benefits, national space laws will always authorize states the right of recourse against the relevant private entities after compensating the damaged third parties.⁵⁹⁾ In the meanwhile, to encourage

56) For specific introduction and analysis of the ILA Model Law, please see: Stephan Hobe, *The ILA Law for National Space Legislation*, in *German Journal of Air and Space Law*, 2013, vol. 1, pp. 81-95.

57) Art. VI of the Outer Space Treaty.

58) More specifics of the Liability convention, see: Hobe, Schmidt-Tedd, Schrogl (eds), *Cologne Commentary on Space Law, (Volume II)*, Carl Heymanns Verlag, 2013, pp. 92-226.

the participation of private enterprises in space affairs, there is always a limitation of the amount when states are obtaining indemnification from private launching entities.

In view of this, the insurance obligation of the private launch entities has the following purposes: firstly, the operator has to insure herself/himself for fault and also absolute liability; secondly, the state can effectively exercise its right of recourse;⁶⁰⁾ considering that the commercial space cooperation between private enterprises from different countries will be a general trend in the future, to purchase a third party liability insurance is a guarantee for the participants of the projects to be able to avoid additional liabilities in case of an accident.⁶¹⁾ However, it is necessary to point out that the purchase of third party liability insurance is not the only choice according to some domestic regulations, as well as the provisions of the “ILA Model Law”. And this should be a factor to be taken into considered when discussing the harmonization of the insurance provisions in different domestic laws.

Concerning the situation in China, the basic demands about the third party liability insurance are regulated in the 2002 Chinese “Interim Measures on the Administration of Permits for Civil Space Launch Projects”.⁶²⁾ In order to acquire a permit for space activities, the operator only has to prove its economic strength for carrying out the project which is the subject matter of the application in this respect. After obtaining the permit, the permit holder must purchase third party

59) Armel Kerrest, *Purpose and Modes of State Indemnification*, in Stephan Hobe, Bernhard Schmidt-Tedd, Kai-Uwe Schrogl (ed.), *Project 2001 Plus: Global and European Challenges for Air and Space Law at the Edge of the 21st Century-Towards a Harmonized Approach for National Space Legislation in Europe*, Proceedings of the Workshop, 29/30 January 2004, Berlin. pp. 121-128.

60) Stephan Hobe, *The ILA Law for National Space Legislation*, in *German Journal of Air and Space Law*, 2013, vol. 1, p.94.

61) Mingyan Nie, *Legal Framework and Basis for the Establishment of space cooperation in Asia*, Lit Verlag GmbH& Co. KG, 2016, p. 103.

62) Interim Measures on the Administration of Permits for Civil Space Launch Projects, 2002, available at: <<http://www.scio.gov.cn/xwfbh/xwfbh/wqfbh/2012/0720/xgzc/Document/1191013/1191013.htm>> last accessed 20 May 2017.

liability insurance before the project enters the launching site stage.⁶³⁾ However, the precise amount of the insurance is not clarified in the 2002 Interim Measure, and it is anticipated that more specific rules can be created after the comprehensive development of private space activities in China.

Compared to the other states' regulations,⁶⁴⁾ Chinese law only requires the applicant of launching activities to purchase third party insurance after getting a permit. In other words, the purchase of third party liability insurance is not a precondition for the private entity in China to get launching permission, but only an obligation before entering into the launching site.

2. The harmonization of the third party liability in Asia for the purpose of promoting regional cooperation

A harmonized approach to domestic space regulations was initially proposed by European countries. The main concerns of this proposal are summarized as follows: firstly, the general interest of the private space industry is to find national space legislation, which provides a legal framework to enable it to carry out its activities in a competitive environment.⁶⁵⁾

From a European perspective, national space legislation which promotes the involvement of the private sector and the development of regional cooperation should impose no additional duties that would make it more burdensome for a space company to perform its activities under the legislation than the national space legislation its competitor has to follow.⁶⁶⁾ However, in the EU non-government

63) Art. 19 of the "Interim Measures on the Administration of Permits for Civil Space Launch Projects", 2002.

64) For example, the Space Damage Compensation Act of 2007 (South Korean) confirms the purchase of a liability insurance as a necessity for obtaining permission for launching a space object. Art. 6(1) of South Korean 2007 Space Damage Compensation Act.

65) Elmar Wins, Kay-Uwe Hoerl, *The Industry's Views Regarding National Space Legislation*, in Karl-Heinz Boeckstiegel (ed.), 'Project-2001'-Legal Framework for the Commercial Use of Outer Space, Carl Heymanns Verlag, 2002, p. 601.

66) Ibid.

entities might either “choose”/ “pre-determine” the applicable legislation by changing various factors of their business environment, e.g. by moving their operations or the headquarters of a firm to a certain state to find the most favorable legislation.⁶⁷⁾ This is the so-called “license shopping” issue. Secondly, the harmonization of national space legislation will foster the development of the national space industry.⁶⁸⁾ And this deserves to be considered by Asia against the background of regional cooperation. Especially to China, which is the sponsor of the only intergovernmental space cooperation organization, the Asia-Pacific Space Cooperation Organization.⁶⁹⁾

The provisions regarding the third party liability insurance are recommended to be created following the fundamental principle of supporting private space activities and space cooperation. More specifically, firstly, for the purpose of creating a stable legal environment for private space cooperation, it is suggested to regulate the purchase of a third party liability as a mandatory obligation, and the other measure of proving the financial capacity of a private enterprise is necessary to be removed gradually from the domestic space laws.

Secondly, the purchase of getting third party liability insurance is recommended to be created as the precondition of getting a launch permit. In other words, the insurance should be achieved before getting the permit. And thirdly, it is recommended to harmonize the amount of this insurance among the main space countries in Asia. However, this harmonization is a target that is not easily to be achieved. The differences of space policies in the Asian countries constitutes a barrier. Furthermore, there are no authoritative statistics to provide guidance as

67) Michael Gerhard, Kristina Moll, *The Gradual Changes from “Building Blocks” to a Common Shape of National Space Legislation in Europe “Summary of Findings and Conclusions”*, in Stephan Hobe, Bernhard Schmidt-Tedd, Kai-Uwe Schrogl (eds.), *Project 2001 Plus: Global and European Challenges for Air and Space Law at the Edge of the 21st Century-Towards a Harmonized Approach for National Space Legislation in Europe*, Proceedings of the Workshop, 29/30 January 2004, Berlin. P. 10.

68) *Ibid.*, pp. 11-12.

69) More information of APSCO, please find at: <<http://www.suparco.gov.pk/pages/apsco.asp>> last accessed 20 May 2017.

to what constitutes a proper amount of insurance so far. When the domestic and overseas launching markets are fully developed, and enough data and experiences are available, it is possible to calculate the maximum amount of insurance and harmonize the regulations of different countries.

Put short, the third party liability insurance is commonly recognized as a precondition to applying for a launch permit by private entities in many domestic regulations. However, there are still differences concerning the specifics of the third party insurance clause between different national laws. For example the requirement of the insurance amount, the rules regarding the time for purchasing this insurance as well as the recourse of the government and its relationship with the insurance, etc. Since space cooperation between private entities from different countries is already realized as a general trend in the future, it is demanded to harmonize the specific factors of the third party liability insurance to avoid the problem of the so-called “license shopping”. Furthermore, a harmonized regime of third party liability insurance will be in favor of promoting the formation of a stable insurance market relevant to the third party liability. And this will further contribute to the growth of commercial space industry and international/regional space coordination. The established China’s “Interim Measures” has already made legal arrangements regarding the third party liability insurance.

However, the present rules are not comprehensive, relevant amendments are required. China’s domestic law of outer space is now in the making process, and the final “Space Act” is anticipated to be adopted in the year 2020. Considering that China is the sponsor of the only intergovernmental space cooperation organization, namely the APSCO, it is suggested that the possibilities are reserved for the future harmonization of the third party liability insurance clauses among the different member states of APSCO.

V. Concluding remarks

Space insurance is a field directly relevant to space commercialization, and the legal regime of insurance is demanded to be coordinated in accordance with the new development of space commercialization, i.e., the private participation in commercial space activities. As a space-faring country, the situations in China are concerned particularly.

Satellites insurance, astronaut insurance and the third party liability insurance about launch activities are concluded as the core types of space insurance. More specifically, the global satellite insurance market is well developed. China has also established a governmental controlled CAIA to be in charge of the insurance issues concerning satellites. However, the present mechanism is probably to be challenged once private entities are capable of launching their own satellites. So the CAIA is recommended to create more favorable policies to private-owned satellites. Moreover, the regime of insurance brokers is demanded to be further developed in China.

As the envoy of humanity, the astronaut is internationally protected by the regime created by the OST and ARRA if accidents occur. Moreover, the government will purchase a full insurance for a flight target. Insurance Corporation of China Life creates a new type of insurance, namely the “Astronauts Group Insurance”, to protect the benefits of Chinese astronauts.

However, more measures are necessary to be taken if the business of space tourism, especially suborbital tourism is fully developed.

The third party liability insurance is always confirmed as a necessary precondition for getting a launch permit. In the Chinese space law, which is planned to be adopted in 2020, provisions relevant to the third party liability insurance will be included. Whereas against the background of international/regional space cooperation between private entities, the possibility for harmonizing domestic space regulations (including the provisions of third party liability insurance) of different countries is recommended

to be reserved. In sum, regulations of insurance are crucial to ensure the regular operation of space businesses. As a space-faring country, Chinese space activities are at present sponsoring and operating by the government, and the insurance regime is established on this basis. With increasing private entities participate in space activities, new legal measures are required to be created.

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Abstract

Legal Aspects of Insurance Regarding Space Activities and the Situation in China: an Analysis Based on the New Development of Space Commercialization

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Insurances of space activities are divided into satellite insurance, astronaut insurance and third party liability insurance. Against the background of the rapid development of space commercialization, especially the increasing participation of private entities in space affairs, the present international and domestic mechanisms of space insurance are challenged. As a space-faring state which is in the process of developing space businesses, the regulations of space insurance in China are deserved to be discussed.

Satellites insurance is at present well-developed, the “pre-launch”, “launch” and “in-orbit” phases of satellites are all possible to be insured by related companies. China created the CAIA in 1997 to provide insurance for Chinese satellites. However, with more private entities start to involve in space as well as satellite industry, the regime established under the framework of CAIA is necessary to be modified, and the mechanism relating to space insurance brokers should be promoted. The astronauts are recognized as the envoy of humankind, and relevant international regulations are made to provide assistance to them in emergency circumstances.

From the domestic perspective, astronauts will be fully insured. China creates a particular type of insurance for astronauts. However, once space tourism becomes a business, the insurance of the tourist will be demanded to be created.

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In order to promote China's space tourism, it is recommended to take the "Astronaut Group Insurance" as an optional model to space tourists, if the tourists are customers of a governmental-owned space company. Once private involvement of providing orbital/suborbital tourism service becomes a reality, new rules are required.

Getting a third party liability insurance is deemed as an indispensable precondition for an applicant to get a launch permission. Domestic space laws will include provisions for the third party liability insurance. China's "Interim Measures" of 2002 realizes the importance of third party liability insurance and requires the permit holder to get it before entering the launching site. This regulation is different from the practices of other states. Concerning that China is the sponsor of APSCO, for the purpose of promoting commercial space cooperation, a harmonized approach to domestic law is recommended to be found.

Key words : space commercialization, space privatization, China's space regulations, satellites insurance, astronaut insurance, third party liability insurance

摘要 (Abstract)

空間活動保險法律問題及中國狀況：基於空間商業化最新發展的分析

聶明岩*

空間活動保險可以簡單的總結為衛星保險、宇航員保險以及空間活動第三方責任險三種類型。在空間商業化尤其是空間私營化快速發展的大背景下，現有的有關空間活動保險的國際和國內法律制度面臨著挑戰。作為一個正在加大力度發展本國空間商業活動的空間大國，中國的有關空間保險的法律規定值得討論。

現階段，有關衛星保險的制度發展良好，相關保險公司有能力為衛星提供“發射前保險”，“發射階段保險”以及“衛星在軌保險”。中國於1997年成立的“中國航天保險聯合體”則致力於為中國衛星發射提供保險。但是，隨著越來越多的私營實體參與到空間以及衛星工業活動之中，有必要對在“中國航天保險聯合體”框架下建立的諸多制度進行相應的調整。同時，應該進一步加強保險經紀人在私人空間及衛星活動中的作用。

宇航員被視為人類派往外空的使者，並且相關的國際法律規範中已經明確確定了宇航員的法律地位並且要求各締約國對於處在緊急狀況下的宇航員予以必要的協助。從國內法的角度看，相關政府會為宇航員購買全額保險。中國人壽保險公司為宇航員創設了特種類型的“宇航員團體保險”，在不同時段為宇航員提供階梯式保額。但是，值得注意的是，一旦外空旅遊發展為一個產業，則有必要關注專門針對外空遊客的保險制度。為了促進中國國內外空旅遊業的發展，建議將中國人壽保險公司創制的“宇航員團體保險”作為一個可選模式提供給外空遊客。尤其是如果這些遊客是政府擁有的外空旅遊公司的客戶的情形下。而當私人實體開始參與提供軌道包括亞軌道旅遊服務，則需要重新考慮制定相應的有關外空遊客的保險制度。

一般而言，獲得一份第三方責任保險是申請人獲得空間物體發射許可證的必要條件。國內法中也會規定空間物體發射許可證申請人購買第三方責任險的義務。

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中國2002年“民用航天發射項目許可證管理暫行辦法”意識到了第三方責任險的重要意義，規定許可證持有人在相應空間發射項目進入發射場之前購買第三方責任保險。這一規定與許多國家的做法存在差異。考慮到中國是亞洲地區唯一一個政府間空間合作組織，即亞太空間合作組織的東道國，爲了促進未來的商業空間合作，有必要考慮對不同國家國內空間法進行協調的問題。

關鍵詞：空間商業化，空間私營化，中國空間法規，衛星保險，宇航員保險，第三方責任險