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The Progress of the Regulations-Making concerning Space Debris Mitigation in China

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Abstract Recently, China pays more and more attention to the issue of space debris, and to the international cooperation in the field. At the same time, China is making progress on the research of the relative international, regional and national laws and regulations concerning space debris mitigation, and is elaborating rules and standards on the mitigation of space debris in China. The paper will comment on these events, and will discuss the issues concerning the implementation of the COPUOS Guidelines on the Space Debris Mitigation in China as well.

I. Introduction

The space debris is seriously harmful to outer space environment, spacecraft, and manned space flight in particular, and if it lands on the earth it will bring harm to human life and property. In 2009 the crash between US and Russian satellites sounded the alarm to international community to control the space debris. In accordance with the Inter-Agency Space Debris Coordination Committee (IADC), the definition of space debris is: "Space debris are all man made objects including fragments and elements thereof, in Earth orbit or re-entering the atmosphere, that are non functional." In 1999 the Scientific and Technical Subcommittee of COPUOS defined the "space debris" as: " Space debris are all man-made objects, including their fragments and parts, whether their owners can be identified or not, in Earth orbit or re-entering the dense layers of the atmosphere that are non-functional with no reasonable expectation of their being able to assume or resume their intended functions or any other functions for which they are or can be authorized." However, there is still no consensus agreement on the definition within the STS.

As a space-faring nation, especially the world's third nation with independent manned space capability, China has paid great attention to space debris mitigation

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issues. China National Space Administration(CNSA) joined in IADC in 1995, and with all its other 10 members passed the "IADC Space Debris Mitigation Guidelines" in 2002 together, and took a series of measures to implement it. At first, make research on space debris issues, and adopt a series of technical measures for space debris mitigation during space launch activities as to protect the space environment. Meanwhile, Chinese policy and legal documents also require space debris mitigation, and develop corresponding standards of space debris mitigation. As China always actively supports the work of the UN COPUOS, in 2007 China signed the "UN COPUOS Space Debris Mitigation Guidelines" and established national regulations to implement it. The practice of these countries, as a part of the results of the international community jointly mitigate space debris, has positive significance for the formation of future international customary law on space debris mitigation.

It should take two kinds of measures to control space debris: on the one hand, from the technical area to resolve all technical problems of space activities, in order to produce no space debris or as little as possible; on the other hand, it guarantees the above measure through the effective management of space activities, effective policies and regulations, and specific national legislation. [2]

This paper will discuss the progress of the regulations-making concerning space debris mitigation in China based on the following areas: the research and technology of space debris mitigation, the mitigation policies, laws and regulations, technical standards and the implementation of the UN COPUOS Space Debris Mitigation Guidelines.

II. The Efforts in Research and Technical Mitigation

The research of space debris includes four areas: observation and measurement, environment and modeling, impact and protection, and mitigation. [3]As a space-faring nation, especially a nation developing manned space activities, China gives more and more attention to space debris monitoring, mitigation and protection. In the early 1990s, China had formed a team to study space debris. Since 2000, under the leadership of CNSA, China set up a "Special Project on Space Debris," [4]started the "Space Debris Action Plan," and has resolved technical problems on preventing the launch vehicle from exploding in orbit, reducing operational debris during the space activities, and the disposal of spacecraft before its end of life. "Space Debris Action Plan" has won recognition not only in the country but also within the scope of international organization, including the IADC. [5]

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[2] Zhang Wenxiang: "Speed up Chinese Legislative on Space Debris", Space Law Review, Volume 2-3, 2009, p. 93.

[3] Zhu Yilin: The research on "The Preparation for Space Debris Mitigation Standards", Space Standardization, No.4, 2000.

[4] Guo Baozhu: "Chinese Progress in Space Debris Research and Follow-up Work", Aerospace China, No. 3, 2003, p. 7. (Sep.2003.). LI Ming: "Progress of Space Debris Research in China", Spacecraft Engineering, vol.16, No.5. P.1

[5] Zhang Wenxiang: "Speed up Chinese Legislative on Space Debris", Space Law Review, Volume 2-3, p. 94.

III. Relevant Policies Statements

At present, the national policies concerned include the "China Space Activities " White Paper (2000), "China Space Activities in 2006" White Paper, "Space Debris Action Plan," and "11th five-year plan on space development." published by the State Council Information Office, states that: "The space debris issue is one of the core challenges human faced in further exploration and use of outer space. Chinese relevant departments pay great attention to the issue, and China has began the research concerned with other countries since 1980s..... China will continue to probe into the measures and ways to mitigate space debris with other countries and to promote international cooperation on this issue. "

The 2006 White Paper, published by the State Council Information Office, states that: "Maintaining comprehensive, coordinated and sustainable development is the fundamental principle of Chinese space industry," and it also points out that: "China starts the Space Debris Action Plan, and strengthens international exchanges and cooperation in the field of space debris research."

Under the unified leadership of National Space Administration, in December 2003, China produced the "Space Debris Action Plan (2006-2020)," ("Action Plan" for short), which brings the significance of space debris mitigation from the policy level to the height of the space environment protection. "Action Plan" includes the realization of "the three projects": first, space debris surveillance and early warning project, including the database of space debris; second, build spacecraft shielding project with space debris shielding design systems as the carrier; third, build space environment protection project based on design standards of space debris mitigation. As a responsible space-faring nation, "Action Plan" shows Chinese determination and practical measures in the fields of preventing space debris and protecting the outer space environment.

Approved by the State Council, on October 18, 2007, COSTIND formally published the "11th five-year plan on space development". It is the first comprehensive development plan for Chinese space industry, and set forth Chinese space legislation and space debris prevention. It points out "to start the work of surveillance, spacecraft shielding and space debris mitigation." And it indicates the sustainable determination and attention of Chinese government to space debris mitigation. [6]

IV. Relevant Legal Regulations

In 1995 China joined in IADC (Inter-Agency Space Debris Coordination Committee), established in 1993, and participated in the development of the "IADC

[6] "11th five-year plan on space development ", National Space Administration web.

Space Debris Mitigation Guidelines", adopted in April 2002. The Guidelines finished its first upgrade in the 25th General Assembly in 2007. The Guidelines require States to adopt policies to ensure the effectively limit of space debris released during future space activities. China later signed the "UN Space Debris Mitigation Guidelines", adopted by the UN COPUOS in June 2007. The Guidelines belong to soft law document with no legal binding force, but it has important political influence. The Guidelines explicitly require that Member States and international organizations should voluntarily take measures, through national mechanisms or through their own applicable mechanisms, to ensure that these guidelines are implemented, to the greatest extent feasible, through space debris mitigation practices and procedures. The guidelines also point out that they are not legally binding under international law. It is also recognized that exceptions to the implementation of individual guidelines or elements thereof may be justified. Although they are not legally binding, some states have promulgated or amended their national regulations to implement the UN Guidelines, and China is also drafting corresponding regulations to implement the Guidelines.

Chinese domestic legislation and management system of space debris mitigation have already got some progress. Although currently there is no real regulations pertaining to space debris existed in China, China has two basic regulations in relevant with space debris mitigation.

(A) "Measures for the Administration of registration of Objects Launched into Outer Space." It was jointly issued by the COSTIND and the Ministry of Foreign Affairs in 2001. The Measures well establish a rather good registration system of space object, and will provide a possible approach for space debris identification. Meanwhile the Measures provide that when major changes (e.g. break up or reentry into atmosphere) of the conditions of the space object occur, the registrant of the space object shall amend the information of the registration, which provides the basis of regulation for the competent departments to duly grasp space debris information. But from the point of the practical situation, the Measures are not very implemented. [7]

(B) "Interim Measures on the Administration of Permits for Civil Space Launch Projects." It was published by COSTIND on November 28, 2002, and there are some provisions referred to space debris. Its article 6, paragraph 4 provides that the applicant shall submit the following registration documents: " the safety design report relating to the project and materials on guaranty of the public security; supplementary materials on the reliability of key safety system, on affects of the normal state and malfunction of the carrier rocket during the launch to the property and personal safety near the launching site and within the scope of the launch track, on how to avoid pollution and space debris, and on other relevant safety." This is the first time of space legislation to explicitly mention the issue of space debris prevention, to provide

[7] Han Jianfeng: "The Space Legislative Review and Chinese Space Legislation Vision on Space Debris," Law Forum, No. 3, 2008, P.79.

provisions for space debris prevention during the launch phase, and to make a useful exploration of the legislation for the space debris. [8]

V. Relevant Standards

After China joined in the IADC, based on the study of space debris technology and according to the "IADC Space Debris Mitigation Guidelines", the COSTIND issued the first part —Requirements for Space Debris Mitigation (QJ3221-2005) of the "Space Debris Mitigation Standards" (hereinafter referred to as "Standards") in 2005. The Standards put forward specific requirements to space system in the areas of design, operation, and post-mission disposal of space debris mitigation at all stages. At the same time it provides for the management of space debris. As the mandatory industry standards in a certain range, "Standards" set the standards for Chinese space debris technology, and also provide some basic information for the future legislation on space debris. According to the plan, the Part II of the "Standards" "Design Guidelines" will enacted in the future.

The preparation of the "Framework System Chart of Space Debris Standards" (first edition) is completed in 2006. The "System Chart" divides the space debris standards into common standards, management standards and technical standards, and also states the expected levels of corresponding standards, such as international standards, national standards, industry standards and enterprise standards. [9]

The above standards force the space debris control to be based on the rule of law. And they provide for basic requirements to the management of programs, design, operation and post-mission disposal of spacecraft and launch vehicles that will be injected in Earth orbit.

VI. Existing Problems

Although there are policies statements and regulations administrating the space debris issues, there are also standards pertaining to space debris mitigation in China, there still exist the following problems in the normative level: the absence of a more powerful, comprehensive space law in China; the competent institutions of space debris mitigation are not clarified and not unified; the requirements of the license application relevant to space debris prevention are only applied to civilian spacecraft; the three projects of the "Space Debris Action Plan" only depend on technology to control space debris contamination, not involve the law. Therefore, the existing legislation still needs to be strengthened.

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[8] Ibid.

[9] Zhang Wenxiang: "Progress in the Research of Space Debris and Environment Protection", Space Debris Research, No. 7, 2007, p. 43.

VII. The implementation of the "UN COPUOS Space Debris Mitigation Guidelines"

China has launched two research projects including the Project on Legislation on Space Debris and Space Environment Protection and the Project on Policies of Space Debris Mitigation. Since the adoption of UN COPUOS Space Debris Mitigation Guidelines, China has actively carried out the implementation work, and through the enactment of single departmental regulations to regulate space debris mitigation and protection. According to related research, the relevant regulations, which are formulating now, will cover both technical and managerial aspects, and will focus on solving the following problems:

(A) Clarify the competent departments of space debris mitigation. Should establish coordination mechanism for the relevant departments involved space activities, as to have regular communication and share information of space debris. When determining the competent departments, it should consider the efficiency and feasibility of management, clarify that the space debris management is under the jurisdiction of China National Space Administration, and learn from the practice of the United States to set up an office of space debris management to be responsible for specific daily management work. A Office for the Studies and Management of the Space Debris has been established in the National Bureau for the Sciences and Technology for National Defense (BUSTIND)

(B) Clarify the definition of space debris. Under the current technology and legal research, the legal definition of space debris should be based on the original definition given by IADC Space Debris Mitigation Guidelines: "Space debris are all man made objects in Earth orbit including satellite, rocket upper stages and other isolates, generated from spacecraft and launch vehicle, that are non functional. "

(C) The specific system includes the technology and management. Concerning the technology, it should first refer to the seven guidelines of the UN COPUOS Space Debris Mitigation Guidelines, and make them as the technical requirements for the design, operation, and mission disposal of the space system in the whole process. As regards the management, it should further improve the registration system, explicitly states that the disintegration in orbit should register, and must inform the space activities to the competent departments in advance, that will result in a substantial increase of space debris; improve licensing system of space activities, at the stage of licensing application, it should state the specific obligations of the space debris mitigation, require the applicant to submit a document on space debris mitigation, or no license; establish damage compensation mechanisms, specifically the subjects of various damage caused by space debris, rules and principles, responsibility approach and national recourse after commitment; establish space debris surveillance and early warning mechanism, clarify the departments and their duties; establish contingency plans for major emergencies.

(D) In the establishment of the future space law, there should be some clear principles about the space debris management issues. Since national policies have stated that private capital can participate in the national space activities, it should pay special attention to the effects and the studies of legal problems (including the effects related to the space debris issues), in order to give regulate these issues as soon as possible.

As the UN COPUOS Space Debris Mitigation Guidelines is a soft law document, Members can voluntarily implement them, and in particular can choose not to implement certain measures. In the process of developing domestic regulations, it should take Chinese practice and economic benefits into account. At this stage the legislation of space debris can refer to standards and regulatory documents of other countries, but due to space debris mitigation measures will substantially increase the cost of space activities, thus the legislation should be based on China's situation and practice, so as to be helpful for its smooth implementation.

VIII. Conclusion

Owing to the success of space debris mitigation and other factors in a few years ago, the development of space debris had occurred downward trend for a long time, but as the result of several recent events, such as in 2007 Chinese anti-satellite test, in 2008 the United States destroyed its own satellite with missile, in 2009 the United States and Russian satellites collided, space debris has emerged to a greater extent. The UN COPUOS Space Debris Mitigation Guidelines is adopted at the right time. Different countries are trying to implement the "Guidelines" through different national mechanisms or other domestic measures, and Chinese regulations and measures referred to space debris mitigation as a part of it, are clearly helpful for reducing or decreasing the space debris, are benefit for the space debris mitigation to develop to be the international customary rule, and can contribute to the sustainable development of space activities.