

IAC-10.B3.8.1

Legal Aspects of International Cooperation in China's Manned Space Flights

Prof. Haifeng Zhao

School of Law, Harbin Institute of Technology, China
zhaohaifeng_c@yahoo.cn

Ms. Xiaodan Wu

School of Law, Harbin Institute of Technology, China
wuxiaodan_rain@yahoo.com.cn

Abstract Initiating its manned space program in 1992, China's technologies and activities in this field have been developing at a rapid rate and have gained many achievements over the last decade. China is the third country in the world that has developed manned spaceflight independently.

Due to the fact that manned space activities involve huge investment and complicated technologies, they are normally undertaken by means of cooperation among the space powers. Although, till now, China's international cooperation in this respect is rather limited in numbers and only relates to partial elements of the whole project, it is undeniable that Chinese government consistently advocates carrying out active and practical international cooperation in space activities and explicitly recognizes that promoting international cooperation in manned space activities is an inevitable trend. Consequently, it can be reasonably anticipated that China will strengthen cooperation in manned space activities with the other space faring nations in near future.

It is important to emphasize the legal parameters to international cooperation in manned space program because legal regimes facilitate the resolution of legal issues and make scientific and technical cooperation between the parties proceed more smoothly. Aiming at giving a consolidated foundation for the future international cooperation, the researchers of this paper attempt to identify and analyze the major legal issues, including registration, liability, intellectual property rights, jurisdiction and control, under the frameworks of the International Space Station and the Asia-Pacific Space Cooperation Organization.

Introduction

The necessity of promoting international cooperation in space activities lies in its inherent international nature, which is also determined the fact that space activities are a high-risk undertaking that requires high-technology and high investment. Consequently, it is hard for one State, especially a developing one, to conduct these activities on its own. Nonetheless, the cooperation between states can serve the purpose of remedying a State's limitation in technology and funding, share the risk and entitle it the benefit of space exploration and utilization. So, from the very beginning of the space era, the international community has recognized the necessity and importance of international cooperation for development, regarding space cooperation as an effective solution to some difficult problems. Actually, international cooperation has been carried out at the bilateral, regional and multilateral levels and strengthened through the broadening of cooperation channels and the extension of cooperation fields. During the last decades, it shows the trend of gradually strengthening: the channels of cooperation are widening and cooperation is pursued in expanded fields.¹ The requirements for technology and investment are more obvious in manned space activities and even the United States of American and the USSR and its successor, Russian Federation cannot afford such huge consumption of human resources and financial funding. In the 21st century, international cooperation is a logical choice for the manned space activities such as the construction, maintenance and utilization of the International Space and lunar probing and landing.

Promoting international cooperation serves as a fundamental principle of international space law. The Outer Space Treaty explicitly provides it as a basic principle for outer space exploration and utilization, which has been repeatedly stresses in its preamble and text.² This has laid down a solid legal basis for international cooperation in space exploration and use. The Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking into Particular Account the Needs of Developing Countries, adopted by UNGA Res. 51/122 of 13 December 1996, further materializes the policies and implementing methods for international cooperation in the conduct of space activities. It has been more 50 years since China embarked on the road to develop its space industry, starting in 1956. It has made eye-catching achievements and ranks among the

¹ K. Luo, "An Analysis on the Developing Trend of International Space Cooperation"(Part I), in 7 *Aerospace China*, 2001, p. 34.

² Article 1(2) of the Outer Space Treaty provides that States shall facilitate and encourage international cooperation in scientific investigation. Article 3 further provides that States shall promote international cooperation and understanding in carrying out activities in the exploration and use of outer space.

world's most advanced countries in some important fields of space technology.³ For half a century, China has worked independently in this field and self-reliance is an important principle for the development of China's space industry. Meanwhile, it emphasizes the importance of international cooperation on the basis of the principles of equality, mutual benefit and common development. China adheres to the policy of opening up to the outside world and actively engages in international space exchange and cooperation. During the last several years, China has accelerated developing its manned space flights. International cooperation has extremely vital significance to speed up the relevant technology development, improvement its safety and saving costs.

This paper will briefly describe the China's policy in carrying out international space cooperation and its current achievements and problems, then analyze the possibility of pursuing international cooperation in China's manned space program, particularly on the platform of the International Space Station and in the framework of the Asia-Pacific Space Cooperation Organization, finally address the relevant legal issues to give a consolidated foundation for the future cooperation

I. China's Policy of International Cooperation in Manned Space Flights

1. The Current Situation and Prospect of China's Manned Space Flights

Manned space activities refers to the exploration, research, experiments, production and military application conducted by the presence of human being in outer space through spacecrafts. Manned space flight is entitled by prominent political willingness: as a symbol of a State's soft power, it demonstrates a State's level of technology and influential power, which also has significant meaning in improving a state's national pride and international prestige.⁴

China started its manned spacecraft program in 1992, which involves three phases of developing strategy. China successfully launched the Shenzhou 1, its first unmanned experimental spacecraft, on 20 November 1999 and recovered it after a flight of 21 hours. Another three unmanned spacecrafts were launched in 2002. Following these was China's first manned mission in space on 15 October 2003: Shenzhou 5 carried Yang Liwei in orbit for more than 21 hours. This achievement made China the third country to independently send humans into space. Two years later, Shenzhou 6 was launched which accomplished the five-day flight with two taikonauts on board who conducted scientific experiments. The success of Shenzhou 5 and Shenzhou 6 marked the ended of the first phase in a satisfactory way.

³ See Preface of China's Activities in 2006, para. 2, issued by State Council Information Office of the People's Republic of China, www.scio.gov.cn/zfbps/gqbps/2006/200905/t308061.htm, last visited on 6 July 2010.

⁴ MIT Report: The Future of Human Spaceflight, (Part 1), *Aerospace China*, 2009, Vol. 4, p. 17.

The spaceflight of Shenzhou 7 in 2008 carrying three crewmember commenced the second phase and the mission include China's first extra-vehicular activity and first space walk. This constituted a milestone of the second phase. Tiangong 1, the target spacecraft, is planned to be launched in the first half of 2011. The Shenzhou 8 unmanned space laboratory module, the Shenzhou 9 unmanned Shenzhou Cargo and a manned Shenzhou 10 will be docked with Tiangong 1 during its two year lifespan to form an 8.5 ton space laboratory module. These missions are planned to achieve technological breakthroughs in space docking technology, the long-term unattended operation of a spacecraft and transferring supplies by cargo spacecraft for the implementation of the third phase.⁵ A basic permanent space station will be the third and last phase. From 2016 to 2022, China is planning to construct a 30-ton space station consisting of three modules to be launched on China's heavy-lift rocket, Changzhen 5, currently in development. The station will operate at 340 to 450 kilometers above the earth and its service life would be about 10 years.

2. China's Policy of International Cooperation in Manned Space Flights

International cooperation is China's policy in conducting space activities, which includes manned space flights. The documents on China's space policies, namely the white paper of China's Space Program in 2000 and China's space activities in 2006 provided consistent elaborations on the principles concerning international space exchange and cooperation, which can be summarized as:⁶

(1) Self-Reliance: China adheres to the principle of independence and takes the initiatives in its own hands. Meanwhile, China carries out active and practical international cooperation in consideration of the overall, rational utilization of domestic and international markets and resources to meet the needs of the national modernization construction.

(2) Supporting cooperation: supporting activities regarding the peaceful use of outer space within the framework of the United Nations, supporting all inter-governmental activities for promoting the development of space technology, space application and space science as well as those conducted between non-governmental space organizations.

(3) Emphasis on regional cooperation: great importance being attached to the space

⁵ China's Manned Space Flights, <http://www.cmse.gov.cn>. See also Official Details 11-Year Path to Developing China's Own Space Station, <http://www.spacenews.com/civil/100414-path-china-space-station.html>, last visited on 7 August 2010.

⁶ See Part IV of China's Space Program in 2000 and Part V of China's Activities in 2006, issued by State Council Information Office of the People's Republic of China, <http://www.scio.gov.cn/zfbps>, last visited on 6 July 2010. See also Yang Mingjie, *Chinese Role in the Regional Space Security Cooperation and APSCO* (Apr. 2007), available at <http://www.docstoc.com/docs/11738677/Chinese-Role-in-the-Regional-Space-Security-Cooperation-and-APSCO> (last visited Oct. 30, 2009).

cooperation in Asia-Pacific region and supporting other regional cooperation around the world.

(4) Multilateralism: reinforcing space cooperation with developing countries and emphasizing space cooperation with developed countries.

(5) Multiple Mechanisms: encouraging and endorsing the efforts of domestic scientific research institutes, industrial enterprises, institutions of higher learning, as well as social organizations to develop international space exchange and cooperation in different forms and at different levels under the guidance of relevant state policies, laws and regulations.

It is obvious that, through multi-level and multi-form international cooperation, China's government aims at peaceful use of outer space, emphasizes equality and mutual benefit and the importance of abidance by international law.

II. The Accomplishment and Obstacles of International Cooperation in China's Space Flights

1. China's International Cooperation in Space Activities

China's international space cooperation began in the mid-1970s. During the last three decades, great achievement has been made by bilateral, regional and multilateral cooperation.

China's government attaches importance to the cooperation with developing countries. Typical examples are China initiated the establishment of the Asia-Pacific Space Cooperation Organization and its cooperation with Brazil, Nigeria and Venezuela. Meanwhile, China also pays attention to the cooperation with developed countries, such as the fruitful cooperation with the European Space Agency on the research and development of Galileo positioning satellite, with Russia on the Moon and Mars exploration. To this end, China has reached agreements on space cooperation with many states and international organizations. China National Space Administration (CNSA) signed inter-agency agreements with national administrative organs of a number of States. China's aerospace industry has established relationship with dozens of countries and carried out fruitful cooperation in many areas such as satellite manufacturing, satellite launching, manned space flights and space technology application. Among others, China actively advocated the establishment of the UN Platform for Space-based Information for disaster Management and Emergency Response (UN SPIDER); CNSA is a member of International Charter of Space and Major Disasters; China joined the International Committee on Global Navigation Satellite systems; China actively participated in the work of the Inter-Agency Space Debris Mitigation and International Deep Space Exploration Strategy and Coordination

mechanism, etc.

2. China's International Cooperation in Manned Space Flights

The complexity of technology involved and the high expenses required in manned space flights entails international cooperation.

China and Russian Federation have established strategic partnership and close cooperation has been carried out between them under the guidance of the Sino-Russian Treaty of Good Neighborliness, Friendship and Cooperation. Regarding to the development of China's manned space flights, Russia has provided assistance to China in the development of Shenzhou manned spacecrafts and astronauts training. In the Shenzhou 7 manned space mission, two taikongnauts were respectively dressed in the "Flying" extravehicular spacesuit developed by China and the "Hawk" extravehicular spacesuit imported from Russia. Their success in conducting the extravehicular activities signaled an important event of Sino-Russian cooperation in the field of manned space flights. Russian participated in China's lunar exploration program and indicated its willingness to assist China in manned lunar landing. China and Russia also affirmed their future cooperation in the Mars exploration. Sino-Russian cooperation can achieve technical and resource complementarity. However, on the whole, the volume of Sino-Russian cooperation is smaller than that of Russia's cooperation with the US, Europe and India.

3. Obstacles confronted by China's International Cooperation in Manned Space Flights

China's international space cooperation has gained some achievements, but it also confronted some obstacles. China's cooperation with developing countries is mainly providing assistance to them. Mainly due to the objection from US, China is absent from major international space projects, especially the International Space Station, the most important international cooperation in manned space activities.⁷

The space cooperation between China and the US is tortuous and difficult and so far, the Sino-American cooperation is minimal. In the late 1980s, China launched US-made satellites by its carrier rocket. But soon after that, the US deliberately put obstacles and deterred its aerospace industry from business cooperation with China based on the reasons that the intention of China's space exploration and utilization is opaque and the sensitive technologies transferred to China could be helpful to develop missile. Moreover, direct technical cooperation in the field of manned space flight is

⁷ Recently, NASA officials denied that China's national space programme had been invited to join the ISS project and indicated that there was not ongoing dialogue about it, despite a news report from Russia suggesting otherwise. <http://www.space.com/news/nasa-china-not-invited-space-station-100628.html>, last visited on 20 August 2010.

blank. The negotiation between Sino-US space agency cooperation on space technology started in 2006 and ceased after China's success in anti-satellite test in January 2007. The Bush Administration opposed the proposal on the Sino-US space cooperation drafted by the NASA. In addition, export control imposed by US domestic laws and some international mechanism has prevented or restricted China's purchase of space goods and related service from the US, the Europe and other States . This has greatly affected the improvement of China's space technology.⁸

The main reason led to the limited cooperation between China and the US are as follows:

(1) Ideological considerations: probably due the difference in social regimes, some American people hold a prejudiced attitude to China as a socialist country and try to connect space cooperation with the human rights issue in China. They can barely accept large-scale and in-depth cooperation with China, especially in including China in the International Space Station.

(2) Concern of National Security: there is no strategic trusting between China and the US. The US government is anxious that the exportation of some items or dual-use technologies would contribute to China's military build-up, such as missile technology and anti-satellite weapons. The US worried that this would improve the capability of China's army force and impose challenges to the American national security.⁹ The US mainstream thought considered China's manned space flights as an important step to military modernization. They contend that the military significance of China's space project is greater than scientific exploration.

Consequently, the US adopts a series of technical blockade, isolation and suppression measures against China. Though the US expressed willingness to cooperate with China, the global partner, but its actions is not consistent. The US purposely ignored China in international space cooperation and seeks to isolate China in technological development. The 1999 National Defense Authorization Act of the US stipulated that any items related to the missile technology control regime must be authorized the President before exportation to China. And the civil satellite and its accessories is put into the export control list in the 1990s, whose exportation requires a license.

Currently, there seems to be three paths for China to improve international cooperation in manned space missions: participating in the existing International Space Station; initiating a new multinational cooperation, which could be under the

⁸ From another point of view, the export control also contributed to China's dependence on the strength of its own to become a space power.

⁹ J. Johnson-Freese, *Space War*, translated by H. Ye and S. Li, China International Culture Press, 2008, p. 213.

Asia-Pacific Space Cooperation Organization; or pursuing bilateral cooperation in its on-going project of constructing a space station.

III. The Legal Aspects of China's Participation in the ISS

The International Space Station is currently the largest project of international scientific cooperation. It also represents an unprecedented level of international cooperation between the US (NASA), Russian (RKA), Canada (CSA), Japan (NASDA) and the European Space Agency (ESA). However, China is the most notable absentee from the ISS. As of now, China does not involve in the ISS, in spite of the fact that China formally expressed its interest in the ISS through different channels, especially after the success of manned space launch.¹⁰ The lifetime extension of the ISS has represented China an opportunity to participate in it. In accordance with the current framework of the ISS, there are two possible means of taking part in the ISS:

1. Joining the ISS as a Partner

If China becomes a partner, it would become involved in all aspects of the ISS program and obtain partner status in terms of authority, management and decision making. The following could be legal problems occurred during the process of joining the ISS as a partner:

First of all, nothing in the Intergovernmental Agreement (IGA), the foundation document for the ISS signed by the 15 partner States in 1998, mentions about the procedure of including a new partner. Therefore, the experience of Russia's inclusion into the ISS would be relevant. When Russian Federation joined the International Space Station, a series of interim agreements reached between the US and Russia led to the final IGA, which functionally integrated Russia into the Space Station partnership.¹¹ However, there would be slim chance for China to negotiate a new inter-governmental agreement. The text of the IGA has laid down the legal framework for the operation and utilization activities in the ISS, which not only provides interesting solutions to a serious of legal problems, but also proves fairly effective in the practice. Furthermore, the IGA was concluded on the basis of the current international space law and China has ratified the main international treaties for space activities, including the Outer Space Treaty, the Registration Convention, the Liability Convention and the Rescue Agreement. So, from a legal point of view, there would be no insurmountable obstacles for China to accept the basic principles of the IGA. For instance, Article 5 of the IGA

¹⁰ For instance, in 2007, when responding to an American report's question whether China in the future would be more likely to compete or cooperate with America in Space, a Vice Minister of Science and Technology, Li Xueyong indicated that China wanted to cooperate with the United States and that China hoped to take part in activities related to the International Space Station, especially as a partner. See http://news.xinhuanet.com/video/2007-10/16/content_6890833.htm, last visited on 20 August 2010.

¹¹ E. Sadeh, "Technical, Organizational and Political Dynamics of the International Space Station Program", in *20 Space Policy*, 2004, pp 177-178.

provides that each partner shall retain jurisdiction and control over the elements it registers and over personnel in or on the Space Station who are its nationals. Consequently, Article 21 of the IGA adopted the criterion of “quasi-territoriality” for the application of the regulation for the protection of intellectual property. This is consistent with Article 8 of the Outer Space Treaty, which States a party on whose registry an object is launched shall retain jurisdiction and control over that object and over personnel thereof. Article 5 of the IGA further provides that each partner shall register as space objects the flight elements which it provides. This provision corresponds to the Registration Convention, which imposes the duty on the States to register space objects launched into the earth orbit.

Secondly, integrating China as a partner of the ISS must be decision of all the partners. In addition, Article 27 of the IGA provides that amendment to the agreement, except for those made exclusively to the Annex, shall be subject to ratification, acceptance, approval or accession by those States in accordance with their respective constitutional processes. Including a partner States definitely constitutes an amendment to the IGA. Thus, China’s participating as a partner cannot avoid a complex journey of gaining permission and ratification of all the partners States. The partner States of the ISS have realized that international participation in the program has significantly enhanced the capabilities of the ISS, which is also demonstrated by the discussion of partnership enlargement, such as including China, India and South Korea on the list of prospective partners. Some space agency leaders, especially Russian and the ESA, have been open to China’s participation in the international project and mentioned the potential for cooperating with China on future space ventures.¹² Nonetheless, the main objection of participating in the ISS came from the United States, who assumes a leading role in the creation and management of the ISS, and the solution would be relieve the unease about allowing China on board. The process is rather ideological and political than legal.

Notably, some changes of current condition could lead to greater possibility of including China as a partner State of the ISS. First of all, it cannot be neglected that China is third nation in the world which has mature technology in manned space flights. For instance, China’s spacecraft carrier can be used as a transportation replacement to the ISS. Secondly, at the moment, no funding has been put in place to support the platform beyond 2015 and it is essential to reduce the cost and one way would be bring in new partners outside the current five. The members of the IIS are expecting China’s investment in the project, which is becoming more urgent due to the financial crisis.

¹² For instance, European Space Agency director general Jean-Jacques Dordain indicated early this year that he would be ready to embrace cooperation with China if the other partners also agreed during the Global Lunar Conference in Beijing. See http://www.chinadaily.com.cn/china/2010-06/01/content_9914843.htm, last visited on 20 August 2010.

Some American even speculated that the investment in the \$100 billion program would diversify China's funding allocation in space activities by less in military aspects and more in civil ones.¹³ Thirdly, it has been realized that isolating China from international cooperation has caused more harm than good. China is one of America's most important overseas markets for high-technology items. In 2007, the US Commerce Department published updated regulations that support US companies in competing successfully in China while restricting the export of technologies that would contribute to China's military modernization. However, there is a general recognition among US industry that the present controls are more restrictive and cumbersome than they need to be. The Obama Administration is determined to reform export control, which is linked to economic recovery.¹⁴ Sino-US Joint Communiqué following the official talks between President Hu Jintao and President Obama revealed that the two leaders agreed to deepen cooperation on the basis of mutual benefits in space exploration.¹⁵ The recently released US national space policy emphasized multilateralism and stated expanding international cooperation would be a goal pursued in its national space programs.¹⁶ All these changes have provided an excellent opportunity for the space cooperation between China and the US.

The last point would be the extent of activities that China would involve in the ISS, especially that whether China will launch an additional module. The ISS is nearly complete now and there is no definite activity plan for its lifetime extension. However, since the rights and obligations of a partner State in the ISS depends to a large extent on its contribution to the ISS, it could be possible that China would provide additional infrastructure elements to the ISS, particularly considering its capacity in carrying out manned space activity. For instance, China's space station modules can be docked to the ISS. Article 1 of the IGA specifically refers to the extensive experience in human space flights of the US and Russia when providing that they would produce elements which served as the foundation for the ISS. Noticeably, amendments to the Annex, which is the lists of the elements provided by the partners to form the ISS, shall require only a written agreement of the partner governments.

2. Participating in the ISS through a Bilateral Agreement

In addition to the partner States of the ISS, there are other participants by signing bilateral treaty with partner States of the ISS. With the entry into force of the Framework Agreement between Brazil and the USA on Cooperation in the Peaceful

¹³ J. Johnson-Freese, *Space War*, translated by H. Ye and S. Li, China International Culture Press, 2008, p. 239.

¹⁴ See remarks by the President Obama in State of the Union Address, 27 January 2010, see <http://www.whitehouse.gov/the-press-office/remarks-president-state-union-address>, last visited on 25 August 2010.

¹⁵ Sino-US Joint Communiqué, see <http://world.people.com.cn/GB/10394969.html>, last visited on 7 August 2010.

¹⁶ National Space Policy of the United States of America, see http://www.whitehouse.gov/sites/default/files/national_space_policy_6-28-10.pdf, last visited on 25 August 2010.

Uses of Outer Space and signing of its Implementing Agreement, Brazil joined as a bilateral partner of the US in the ISS.¹⁷ Through this arrangement, Brazil supply hardware to NASA. In return, NASA will provide Brazil with access to its ISS facilities on-orbit, as well as a flight opportunity for one Brazilian astronaut during the course of the ISS programme.¹⁸ Italy has a similar contract with NASA to provide comparable service.¹⁹ So, a bilateral agreement with one partner State can also make China a participant of the ISS. Now, it seems that this kind of bilateral agreement could possibly be reached between Russia and China. For instance, when the space shuttle retires and the Soyuz spacecraft needs a backup, China's Shenzhou spacecraft can be used to ferry crews to and from the Space Station. Though nothing in the IGA mentions about this kind of bilateral arrangement, it can hardly be concluded with a disagreement of one partner State. Italy takes part in the programme directly via its membership in ESA, so its bilateral agreement with the NASA does not pose any legal obstacle. When it comes to Brazil, the Russia Federation did not take part in the ISS and the US took a dominating role in the ISS and the acceptance of Brazil as a participant did not give rise to any debate. However, the bilateral agreement between China and Russian could hardly be conceived with the disapproval from the US.

IV. The Possible Legal Issues of Manned Space Cooperation in the APSCO Framework

The Asia-Pacific Space Cooperation Organization established in Beijing could be a platform to conduct international cooperation for China's manned space flights. As a APSCO member which is carrying out its space station, China can invite other members to participate in the station construction.

1. The APSCO can provide a platform for manned space cooperation

The scope of cooperation stipulated by the 2005 Convention of the Asia-Pacific Space Cooperation Organization includes manned space flights. During the ten years lifespan of China's space station, other APSCO Member States can be invited to be on board. For example, these States can carry out scientific experiments, send astronauts to visiting the station and even launch additional modules.

¹⁷ The Framework Agreement between the Government of the Federative Republic of Brazil and the Government of the United States of America on Cooperation in the Peaceful Uses of Outer Space was signed on March 1, 1996 and entered into force on July 9, 1997. The Implementing Arrangement between the Government of the United States of America and the Government of the Federative Republic of Brazil on the Design, Development, Operation and Use of Flight Equipment and Payloads for the International Space Station Program entered into force on the 14th October 1997.

¹⁸ See http://www.nasa.gov/worldbook/intspacestation_worldbook.html, last visited on 20 August 2010.

¹⁹ http://www.asi.it/en/flash_en/living/the_international_space_station_iss, last visited on 20 August 2010.

2. The Concept of Fair-return

The concept of fair-return for Member States is the corner stone of the Organization's industrial policy. Its application in manned space flights would promote the participation and investment in the space station.

3. Jurisdiction and Control

This issue depends on whether there would other Member States' national work on the station and whether they would launch additional modules. In accordance with the relevant provisions of international space law, if it happens, the concerning States would retain jurisdiction and control on the elements it registers and over personnel in or on the Space Station.

4. Intellectual Property Rights

Article 22 of the Convention provides that the Organization shall abide by international conventions concerning protection of intellectual properties. Furthermore, intellectual property rights of those inventions, products, technical data or techniques as well as other intellectual properties resulting from any programs and activities that are carried out by the Organization or through use of the resources owned by the Organization shall be owned by the Organization. This is different from the quasi-territorial criteria adopted by the IGA.

Concluding Remarks

Manned space flight is a great and vast undertaking of human beings to venture into the mysterious universe, explore the unknown world, and discover the future of mankind. The mankind business should be achieved through the joint power of humanity and international cooperation.