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China and the International Space Station (ISS): China's distance from the project

According to most historiography regarding ISS partnerships and policies, China's involvement with its creation and on-going development has been insignificant despite it being the first major cooperative space science project in history. As the third country to establish a substantial human space exploration program using viable manned spacecraft, China's association with other spacefaring nations confirms the technological linkages and political climate, which suggests significance between the Chinese space program and political dynamics.

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TO UNDERSTAND THE CAUSES of the strategic political relationship between the United States and China, one must understand the underlying socio-political mechanisms that led to China's isolation from the Project. Had a partnership between the United States and China transpired sooner, progress within the foundational years of the ISS life span, to include its financing and technical capabilities, would have allowed for the U.S.-China cultural/political relationship to stabilize and cultivate a space partnership. Government-to-government talks would have provided mutual and cost-effective outcomes.

International essence

With the space station being the first and largest international scientific project, its history produces a wide-range of mixed perspectives and meanings. At present day, the ISS is managed and maintained by multiple nations as it orbits the earth with added modules and segments from different partners around the world. The ISS view reflects an international essence with the Russian Soyuz spacecraft, Zarya Control Module, Zvezda Service Module, and Unity Node; Japanese Kibo laboratory, robotic arm, and Experiment Logistics Module Exposed Section; Italian-built Node 2, Harmony pressurized module, ESA's Columbus research module; Canadian Dextre robotic device and Canadarm2; in addition to American components.[1] Yet, China is not among them. China's seclusion amidst the global enthusiasm and accomplishments may be explained by the political framework and global environment that was in place prior to the development of ISS.

Long before the International Space Station secured its title in 1998, the U.S. was acclimating to the idea of a collaborative space project, while China remained seemingly withdrawn. Before the formation of the ISS, U.S. initiatives for foreign participation and technology sharing set the precedence for the first and largest scientific undertaking under peaceful auspices. Because the origins of the ISS political framework were U.S.-oriented, compatibility with U.S. policies made it difficult for China to obtain an invitation to the Project.

There are two theoretical frameworks that best examine the American-Chinese political construct between the two nations: *military strategy versus civil cooperation and U.S. influence on space policies and space technologies.* These themes illustrate the ISS as an instrument for foreign policy making, especially for the U.S.

U.S. influence on space affairs

U.S. success during the formational years of space policy and ISS history had much to do with the international socio-political setting. In the years leading up to the Cold War, U.S. space policy was dually conducted for separate objectives – one towards national security and the other towards civil activities. Conclusion of the Cold War meant new possibilities for space cooperation. International cooperation was very important for nations to be successful towards space-related initiatives because of funding and required advanced technologies. The early years of space collaboration, though complicated to say the least, helped align international policies and agreements towards outer space objectives for leading spacefaring nations. The ISS represented this kind of cooperation through science. Because the ISS was historically assembled through international cooperation, China's selective nature in the international setting and inaccessible space p rogram during those years were some of the principal factors that kept the country from gaining a substantial role in the making of the ISS. The U.S. became the choice partner for space-related activities not only for its expertise, but for its willingness to share information. Clearly the foundation was set for potential partnerships in space-related ventures, but the task proved to be arduous work. During the development of a U.S.-led space station, it was difficult to obtain a consensus on how to systematically provide terms and solutions with potential partners. The European Space Agency (ESA) eventually accepted the U.S. invitation to the space station project, as long as it would be looked upon as an *international* space station rather than a *U.S.* space station (though the U.S. viewed this differently and remained in the leading role). The U.S. understood the importance of ESA's partnership because of their, compared to other potential partners, stronger financial and political position. Furthermore, most notable space initiatives during this time were U.S.-led, which meant that international cooperation was inherently partial to U.S. interests.

Military versus civil objectives

U.S.-China space cooperation can be best described as a causal relationship. With such vast dissimilarities between the governments and internal management, both nations have answered each other's space mission successes with strategic reaction. In order for space cooperation between the U.S. and China to evolve, national security concerns surrounding sensitive technologies must be addressed. In the early 1970's, the U.S. lifted its technology embargo against China, but no real progress was made at that time. The U.S.-China relationship in science and technology (S&T) began in 1979 with the Agreement on Cooperation in Science and Technology, which offered a tangible opportunity for cooperation. Unprecedented in their political background, the China-U.S. S&T agreement eased strict technology transfer and export controls, though it was short-lived. In the report *Select Committee on U.S. National Security and Military/Commercial Concerns with the People's Republic of China,* submitted by Representative Christopher Cox, the PRC transfer of ballistic missile technology to Pakistan (a non-Missile Technology Control Regime (MTCR) country) in 1991, caused the U.S. to apply sanctions through the MTCR Annex and denied export licensure.[2] Such sanctions were also enforced on China's aerospace industries, Chinese Academy of Space Technology, China Aerospace Corporation, China National Space Administration (CNSA), and other related organizations. New legislation and policies post Tiananmen Square also led to the prohibition of export licenses for U.S.-built satellites on PRC rockets, munitions, and crime equipment.

China's close relationship between military and civil ambitions has been the greatest factor impeding China's partnership with the ISS. In China, satellite and space technology usage often have dual purposes. Since space control systems have proven to be vital during wartime efforts, global competition for space control and resources has escalated. As an economic venue and military outpost for surveillance/targeting, the military threat and supremacy within the space domain continues to be a critical factor for space partnerships.

In order for China to be able to address the challenges for ISS partnership, the political setting must first adjust to information sharing, commercialization and NGO-management of the ISS as it departs from its military roots. First of all, NGO administration would provide China with opportunities to engage with U.S. organizations more receptive to cooperation, though they still have to adhere to agreements and regulations at the state-level. Secondly, commercialization has provided external funding from spin-offs on space technology. Finally, China's involvement in space cooperation for non-military objectives has been important for the country's image, especially if China hopes to join the ISS partnership in the future.

Involving countries such as Brazil, Italy, Germany, Russia, Argentina, Chile, Japan, Britain, and Ukraine, China's history of space cooperation has included technology development, scholarly exchanges, and commercial space services. China's role in space accountability and multilateral cooperation continue to be beneficial in networking and connecting it within the global space community, such as the United Nations Office of Outer Space Affairs. Through such global forums, the strategic relationship between China and the U.S. can yield socio-political solutions on civil cooperation versus military objectives.

Above: From the Johnson Space Center collection: digital artists' concepts promoting future collaboration and the International Space Station. (NASA/courtesy of nasaimages.org.)

The surviving China-U.S. Understanding on Cooperation in Space Technology agreement has given both nations the opportunity to use peaceful approaches for outer space activities. The U.S. and China have participated in other space-related activities such as geodynamics/plate tectonics research projects and multilateral cooperation for the Committee on Earth Observation Satellites. The Alpha-Magnetic Spectrometer (AMS) program, a research experiment program from the ISS involving the Chinese government-sponsored researchers, NASA, and the U.S. Department of Energy, has also brought the nations closer to space cooperation.[3] AMS has been able to link China and the U.S. together towards ISS participation on a small-scale.

In contemporary challenges, Irene Klotz' *New Scientist* article mentioned how NASA modified the Orion module of the ISS to be technically compatible with Chinese spacecraft when the agency looked ahead to the Shuttle replacement, as well as extended space tracking services to assist China's Shenzhou missions to avoid debris.[4] It is apparent that U.S.-China space cooperation will improve. Both the indirect and direct benefits from China's space program to the ISS have shown that cooperative efforts can achieve important solutions for ISS future capabilities. If the risks associated with Chinese commercial and technical involvement are comparable to tolerable losses from Russian or other ISS partnership shortfalls, it is arguable that China could be an acceptable benefactor of the ISS project.

Conclusion

In summary, the transformation of foreign policies and space program objectives, from the start of the twentieth century to the modern space age, has been closely aligned with the state of political affairs, particularly national security. Concerns that contributed to China's isolation with the ISS included their economy, foreign policies, ideology, and military aims. China's steady progress has strong implications for the ISS, particularly as ISS administration and support continually adopts innovative technical, commercial, financial, and cooperative solutions. Earlier involvement with China could have greatly improved the ISS' life span and technical capabilities, improved U.S.-China's cultural/political relationship, and relieved some financial strain on the Project. The likelihood that China would have accomplished significant developments in space as well as provided the ISS meaningful contributions is plausible considering the history of both nations' tenacity to succeed.

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Notes

1 Susan Wells. "International Space Station Overview," Boeing Defense, Space and Security, accessed 15 January 2013; http://tinyurl.com/76ou4pw.

2 *Report of the Select Committee on U.S. National Security and Military/Commercial Concerns with the People's Republic of China* ('The Cox Report), prepared by members of the Select Committee, submitted by Rep. Mr. Cox, 105th Cong., 2nd sess., 1999, Committee Print 105-851, chapter 9.

3 Jin Xiaoming. 2003. "The China-U.S. Relationship in Science and Technology" (paper presented at "China's Emerging Technological Trajectory in the 21st Century" forum, New York, Lally School of Management and Technology, Rensselaer Polytechnic Institute, 4-6 September 2003).

4 Irene Klotz. 2006. "Will U.S. and China be Friends in Space." *New Scientist* 191(2571):16.