

Five Patterns of International Cooperation in Manned Space Exploration and China's Strategic Choice

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With manned space exploration accelerating, international cooperation is also on the rise. Cooperative space exploration provides many benefits, including mutual technologic and economic gains, risk sharing, strategic trust building, and advancement towards peaceful use of space. This paper briefly recalls instances of international space cooperation during and after the Cold War era, then group them into five forms or patterns of manned space cooperation, analyzing characteristics of each, and finally makes recommendations as how China should make the appropriate strategic choices among the five patterns.

1. Five Patterns of Cooperation in Manned Space Exploration

Cooperation in space exploration can be traced back to the 1950s soon after we earthly humans took the first look of the out-space. Although the Cold War sets the curtain between the two super power blocs, the Soviet and the American space scientists and astronauts still managed to work together in a limited manner. As the relationship between the two big space powers began to improve in the 1970s and 1980s, space cooperation also showed signs of improvement, from unmanned to manned space exploration. In the post-Cold War era, this international cooperation accelerated in terms of level of technology, range of scientific studies, coverage of global common intersts, and diversity of the cooperative patterns. Specifically, there are five major patterns of cooperation, namely, joint venture, asset sharing, change in kind (bartering), warehousing supermarket, and training school .

Joint venture --- Definition and examples

Asset sharing --- Definition and examples

Change in kind (bartering) --- Definition and examples

Warehousing supermarket --- Definition and examples

Training school --- Definition and examples

As indicated above, each form of cooperation has its own features and requirements... (Description of features and requirements)

Furthermore, each type of manned space cooperation poses different level s of gains of risks... (Description of gains and risks)

It also must be noted that whatever form of cooperation, politics plays a role, depending on the national security, diplomatic and other considerations. Besides, any form of such cooperation involves technical exchanges and transfers, thus touching the nerves of property right protection and information security.

2. Strategic Perspectives of China's Manned Space Exploration and Cooperation

China is the third country in the world to have developed technologies for sending astronauts into the out-space.... (Description of achievements so far)

However, compared with the more matured space powers, China is still in the fledging stage. Not only technologically inferior, China also lacks the capabilities to appropriately and timely convert space capacities into market competitiveness, which in turn, increase the general risk in the huge investment in the space development cause. Without such competitive power, the investment itself would hardly remain sustainable. This may explain why the Chinese government official XXX remarked that China hopes to forge cooperation in technology development, applications study, astronauts training, joint space flight, etc.

Specifically, China still lags largely behind Russia and the U.S. in areas such as ...(description of area China is obviously inferior)

As for the investment in manned space engineering, China mainly depends on government to allocate funds. Without meaningful and productive return, such huge investment already raises lots of questions about its worthiness. This is another reason China should open arms for more international cooperation such as to attract more investment from diversified sources and also produce economic returns.

Manned space exploration is an important component of a country's power, both soft and hard. Cooperation, particularly with the third world countries, helps expand the soft aspect of this power and improves China's image internationally.

3. Choosing the patterns of cooperation wisely

Based on the analysis above, China should choose the patterns of cooperation in manned space exploration that best fits is near, mid and long term objectives.

Table:

Gains & Risks	Joint venture	Asset sharing	Bartering	Supermarket	Training school	
Technical gains	High	Average	High	Average	Low	
Economic gains	High	High	Low	High	High	
Political gains	High	High	Average	Average	High	
Investment risk	High	Low	Low	Low	Low	
Technical risk	High	Average	Low	Low	Low	
Political risk	High	High	Average	Average	Average	
Legal risk	High	Average	High	High	High	
Information sec risk	High	High	Average	Average	High	

Following six paragraphs explain in more details the “Gains & Risks” of the table above....

4. Conclusions and Suggestions

In pursuing the manned space exploration, China should promote and participate in international cooperation. Such cooperation will serve a number of considerations, including, but not limited to, absorbing advanced technology and management, drastically accelerating the speed of China development speed, distributing the investment risk, increasing the return of investment, extending China’s soft power influence and improve China’s image as a responsible stakeholder on the international arena.

In near term, since the world is still pulling itself out from the economic difficulties, and since the global landscape is yet to complete the reshaping, China should be very careful if it choose “joint venture” partners. With Russia, the United States and other advanced space club members, China may consider seeking cooperation in the form of “asset sharing” and/or “exchange in kind”. This should help reduce strategic mistrust and building confidence with each other. Further, this will help lay foundation for more substantial cooperation in the future. With the vast majority of less developed countries, China may adopt the forms of “supermarket” (letting those countries to pick and purchase technologies they need most) and “training school”. This way, China can help those countries utilize the space technology for the benefit of their own economic development on the one hand, and on the other, achieve necessary economic gains. More importantly, by assisting the less developed countries to share the benefits of space technologies, China will be viewed as more “responsible”.

In the mid and long term, when the relationship between and among the big powers become more stable, China may take the “joint venture” form of cooperation with them. In particular, China may join in and contribute to the international effort in building large and sustainable space stations.