

GUNJAN SINGH

## **China in Space** *Scenarios for the Future*

Gunjan Singh

Ms. Gunjan Singh is a researcher at the Institute for Defence Studies and Analyses (IDSA), New Delhi. Her research interests include mainland-Taiwan relations, Chinese media and civil society, gender issues in China, Tibet and space security. She is the assistant editor of the CBW magazine, published by the IDSA, is co-editor of Space Security and Global Cooperation, and has published in Harvard Asia Quarterly, Strategic Analysis, World Affairs: A Journal of International Issues and The Book Review.

### **Abstract**

This paper's purpose is to picture possible space 'schemas' of China two-to-three decades from now. Following the introduction, section two assesses various drives which could impact the future of China's space program. These are derived from contemporary political and technological trends, current debates on space technologies, and the trajectory of rival countries' space programs. Hypothetical scenarios based on these factors form section three. The final section outlines three possible scenarios and identifies the boundary conditions that might trigger their materialization. This section also discusses various potential outcomes that could modify the course of the Chinese space program with respect to changes and developments in other areas like the economy, domestic stability, bilateral relations, and also domestic political developments. Finally, this paper presents policy recommendations based on assessments of the scenarios.

## Introduction

The much debated ‘rise’ of China has now become a reality. Various factors from economic growth to raw human capital have contributed to this rise. Although China has not stated its strategic vision officially, the country’s ambition and vision for the future can be broadly inferred against the backdrop of its economic development, military modernization, and massive achievements in science and technology.

This paper is divided into three sections. Section one assesses various drivers that could impact the future of China’s space program. derived from contemporary political and technological trends, current debates on space technologies, and the trajectory of rival countries’ space programs. After discussing the drivers that could impact China’s space program, section two describes three potential scenarios for the future of China’s space program: China as a benign space power, China as an aggressive space power, and China as a failed space power. Finally, this paper concludes by discussing the implications of the three scenarios and the steps that should be taken to encourage China’s development in a benign direction.

China fully realizes that the mastery of science and technology is critical in making the country prosperous. In 2006 the Chinese government adopted the “indigenous innovation” campaign with the ultimate goal of transforming the country into a “science powerhouse” by the year 2020.<sup>1</sup> This campaign seeks to build on the significant developments China has made over the past few decades and its substantial investments in: nanotechnology, biotechnology, information and communications technology (ICT), nuclear energy, clean energy, robotics, and strategic material technologies to name only a few. Their success, particularly in the arena of space technology, is noteworthy.

The benefits of investing and utilizing space technology are large and far reaching; it possesses both socioeconomic and strategic utility. It has the potential to increase China's economic and military stature and, more importantly, it can exhibit a state's techno-strategic superiority vis-à-vis other countries. Space technology remains one of the few technologies that only a select number of countries possess, and expertise in this field is one of the most important parameters in measuring the level of development achieved by a country. Currently, space technology is seen as an important measurement of a country's desire to achieve a place at the international 'high table'--something very similar to the international recognition extended through the possession of nuclear technology and weapons.

Today, there are less than ten nation-states in the world that could be considered space-faring.<sup>2</sup> The United States and Russia are known for their expertise in the space arena and have achieved spectacular successes including the establishment of an operating space station and completion of Mars missions. China has made rapid progress in this arena, particularly over the last decade. Having successfully launched a manned space mission, completing a spacewalk, and also conducting an anti-satellite weapons (ASAT) test China is now considered one of the foremost space-faring nations in the world.<sup>3</sup>

### **Overview of the Chinese Space Program**

China launched its first satellite on April 24, 1970,<sup>4</sup> the fifth country to achieve this goal after the Soviet Union, the United States, France, and Japan.<sup>5</sup> More than 40 years later, President Xi Jinping explicitly laid out the importance of space technology and the country's ambitions in the field stating that: "The space dream is part of the dream to make China

stronger. With development of space programs, the Chinese people will take bigger strides to explore further into the space.”<sup>6</sup>

The major impetus for the Chinese space program came after the fall of the Gang of Four and Deng Xiaoping’s rise to power. Like its nuclear program, the Chinese space program developed originally as a military initiative.<sup>7</sup> It was under the leadership of Deng that China approved Plan 863, also known as National High-Technology Research and Development Plan.<sup>8</sup> Plan 863 was adopted to boost China’s capacities in high tech technologies and other security related technologies and sciences. The Chinese indigenous program<sup>9</sup> also emerged, under which China has developed a number of technologies on its own. China committed vast resources to back these initiatives, by pouring financial support into research projects, and sending a number of Chinese scientists to be trained abroad.<sup>10</sup>

In just three decades China’s space program moved to be one of the most important ones in Asia --especially in the

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area of military space technologies and human spaceflight. China today has the second largest space budget in Asia.<sup>11</sup> Furthermore, China has been engaging with various countries on a multilateral level with respect to space, and is heading a group called Asia-Pacific Space Cooperation Organization (APSCO). Other members of the group include: Pakistan, Bangladesh, Mongolia, Thailand.<sup>12</sup> It is important to note that Japan and India are not members of this organization despite their own space-faring credentials.<sup>13</sup>

China has also released three white papers on its space program in 2000, 2006, and 2011.<sup>14</sup> An overview of these white papers shows that the Chinese space program is on course and the government has detailed goals for the coming decades. A reading of these white papers also shows that China has managed to stay on schedule and has achieved the majority of its stated goals. This indicates that the central government clearly understands the payoffs that achievements in the space arena could potentially bequeath to their domestic credibility and economic strength.

Due to the retirement of NASA's shuttle fleet and the surprising number of failures encountered by Russia's missions, China's space program has been receiving more attention. China successfully demonstrated the capability to launch a manned space mission in 2003<sup>15</sup> and undertake spacewalks in 2008.<sup>16</sup> China also has a major satellite navigation program called Beidou which may challenge the supremacy of the US navigation system and become the most used system in the future. Further, China has a constellation of sixteen navigation satellites and four experimental satellites all which are operational.<sup>17</sup> In December 2012, China declared its regional navigational system operational and has been using the system for the Asia-Pacific region.<sup>18</sup> It also plans to launch and develop an independent space station in less than a decade and hopes to have a fully operational space station by 2022.<sup>19</sup> The first module of this station has already been put in space, and China has successfully carried out docking (both automated and manual) with this module.<sup>20</sup> There are also reports suggesting that China may be planning to undertake another ASAT test.<sup>21</sup> Due to such significant developments, it is essential to examine the future of China's space program.

## Emerging Trends

China's space budget has been consistently increasing over the past few years. James Clay Moltz argues that the difference between the Chinese space program and its American peer is the "sheer scale of resources available to it."<sup>22</sup> Currently, China's space budget is rising while the United States' space budget is decreasing—though NASA still operates on a greater overall budget.<sup>23</sup> According to a report in *The Week*, "the Chinese space program gets by on around \$1.3bn per year - compared to Nasa's \$17.6bn - but it is already proving an embarrassment to America. With a little more of China's financial might behind it, it could deliver a lunar base some time in the 2020s."<sup>24</sup>

Ajey Lele asserts that the importance of the Chinese space program is fully understood by the Chinese leadership. He argues that the Chinese leadership is aware of the "dual-use nature of space technology."<sup>25</sup> Space technology, which has a number of civilian uses, like weather forecasting and disaster management, can also be used for spying and gaining information, and those uses underwrite the country's motivations for funding research in the field. A number of similar technologies are being tested by the United States, like the Air Force's X-37B robotic space plane and the HTV-2 hypersonic glider prototype of the Defense Advanced Research Projects Agency (DARPA).<sup>26</sup> The GPS technologies that are primarily used for civilian purposes can be used to disrupt and hamper services. It is because of this dual nature of space technologies that the United States has not been open to sharing its technical knowledge.

China launched its first manned mission in 2003,<sup>27</sup> and by 2013 Shenzhou-10, the fifth manned space mission of China, had successfully completed its manual as well as automated docking processes with

Tiangong-1, the first space station module of China<sup>28</sup>. Chinese media take considerable pride in these achievements; as *People's Daily* stated, “with 10 [sic] astronauts and six spacecraft launched in a decade, China is speeding up on the path of exploration and building a home for [sic] Chinese in the galaxy.”<sup>29</sup> Lele has argued that, “the Chinese space struggle is commendable because in limited time it has succeeded in at least selectively closing some gap between ‘two superpowers’.”<sup>30</sup> China is only the third country to have successfully undertaken a manned space mission and conducted an ASAT test. As further proof of their ambition, the country is also proposing to build a space station by 2022.<sup>31</sup>

A robust space program offers substantial domestic and foreign policy options to those countries that have the means to develop them. China’s program, although still young compared to its peers in the United States and Russia, has leapfrogged several intermediary hurdles thanks to the country’s link to several emerging and recently invented technologies. Meanwhile, the program caters to societal and economic requirements (primarily areas like fishing, weather forecasting etc.) and is an important element of China’s foreign policy. China has been helping in launching satellites for a number of countries like Sri Lanka<sup>32</sup>, Nigeria<sup>33</sup>, Pakistan<sup>34</sup> etc. and thus extending its ‘soft power’ reach.

## **Methodology**

Keeping these developments and various arenas in mind, scenario development is an effective way to predict the future of China’s role in space. Scenario development helps visualize future outcomes using several known drivers. It is important to note that “the purpose of scenario planning is not to pinpoint future events but to highlight large-scale forces that push the future in different directions. It’s about making these forces

visible”.”<sup>35</sup> It also helps the planners make better decisions by studying the emerging trends.

In order to build probable scenarios it is necessary to identify important drives which affect the growth of Chinese space capabilities. This article identifies five essential factors in forecasting the trajectory of China’s space ambitions: great power status, nationalism, military development, the economy, socio-economic development, and deep space ambitions. In order to understand the role of the above-mentioned drivers a brief discussion of each is required to help understand their influence on the Chinese space program.

### *Great Power Status*

One of the major themes in the discussion of China’s economic and military development has been that Beijing is not happy with being a regional power and is working to regain its position as a “great power.” On the one hand, China has been consistently advocating multi-polarity in international affairs. On the other hand, Beijing has been working to improve its military capabilities.

On the military front, China has undertaken the full modernization of the People’s Liberation Army (PLA). Srikanth Konapalli states, “[these developments] enhanced military capabilities of the country [China] to overcome the perceived challenges of the state and make China a great power.”<sup>36</sup> Thus the desire to achieve the ‘lost’ great power status is one of the key driving forces behind Chinese investments in space technologies and space program. China regards supremacy in space as an essential indicator of great power status.

The last decade has witnessed an increase in China's presence in the Asia Pacific region, while the United States has reduced its presence despite the efforts of the Obama administration. The geographic proximity of China compared to that of the United States is a key factor in this asymmetry.

China has also been working towards gaining a foothold in South Asia, Africa, and Latin America. Beijing has increased its foreign aid, financial investment, and has become involved in a number of infrastructure projects within those regions. China has also been successful in gaining political leverage while undertaking economic cooperation, especially with respect to African countries. This was visible when Gambia withdrew its recognition of Taiwan in 2013.<sup>37</sup> These diplomatic steps highlight the efforts Beijing has put into expanding its influence and reclaiming its great power status.

On most of the parameters (GDP, military expenditures,) China today is second only to the United States.<sup>38</sup> As argued by Paul Dibb, "President Xi Jinping promotes the idea of the "China Dream," which is about restoring China's traditional, and from its perspective, rightful position as the leading or dominant power in Asia".<sup>39</sup> In addition, under the leadership of Xi Jinping, China has shown interest in playing a major role internationally. Elizabeth Economy believes that "Xi Jinping has ambitions to be a global leader, and a global player, in ways that his predecessor didn't."<sup>40</sup>

### *Nationalism*

In the last few decades, nationalism has played a very important role in the foreign policy of China. Scholars have argued that Chinese nationalism has been shaped primarily by an 'anti-west' phenomenon.<sup>41</sup> Minxin Pei argues that much of Chinese nationalism is a creation of

Western imperialism.<sup>42</sup> Jean-Pierre Cabestan has argued that nationalism in China can be regarded as a synonym for “patriotism.” It is primarily “an official nationalism.”<sup>43</sup> There is an added element of pride that Chinese people feel towards their country’s achievements because they are perceived as a step forward on the path of international glory. In most cases such ‘feelings’ are promoted by the Chinese Communist Party (CCP).

In recent years the Chinese leadership has used the fervor of nationalism to gain support for its foreign policy. This has been vividly summarised by Suisheng Zhao who stated that, “Deng Xiaoping and his successors, Jiang Zemin and Hu Jintao, wrapped themselves in the mantle of pragmatic nationalism, which they found remained the most reliable claim to the Chinese people’s loyalty and the only important value shared by the regime and its critics.”<sup>44</sup> The feeling of nationalism seems to gain momentum whenever there is an issue related to Japan, the United States, or Taiwan. Varaprasad Dolla argues that nationalism as an ideology appeals more strongly to the Chinese leadership when compared to Communist ideology because it is directed towards the “other” and does not have any major consequences for the ruling party.<sup>45</sup>

The Chinese people have shown to be highly sensitive to issues that tend to affect their perception of national pride and greatness. Major outcries and claims of imperialism are trumpeted when they feel that there is a conscious attempt by other countries (especially the United States and Japan) to obstruct China’s growth. The CCP uses the rhetoric of nationalism to maintain its claims to authority. Susan Shirk argues, “the CCP’s post-Tiananmen effort to rebuild its legitimacy through the patriotic education campaign is largely responsible for the increase in anti-foreign nationalism among today’s youth.”<sup>46</sup>

Every achievement of the country is attached to national glory and thus further fuels the feelings of nationalism. In the case of space capabilities, developments are applauded with nationalistic fervor. Achievements in the field of space technology are portrayed as a means by which China is regaining its lost position and successfully competing with the United States. The sentiment attached to the nationalistic fervor has been nicely summarised by David Lundquist, a lecturer of Western philosophy at Tsinghua University in Beijing. He argues that, “from territorial disputes to intellectual property theft to the undervalued *renminbi*, the prevalence of the notion that China, as [sic] great power, is simply taking back what it rightly deserves can’t be overlooked.”<sup>47</sup>

### *Military Development*

China’s rapid and consistent economic growth has provided the government with enough resources to undertake military modernization and development. For the past few years the Chinese government has been increasing the share of government revenue in GDP, part of which it then assigns for military modernization. According to a *Washington Quarterly* report, in 2011 the Chinese defense budget was \$91.5 billion<sup>48</sup> and it grew to \$100 billion in the 2012 budget.<sup>49</sup> In addition, Beijing is investing heavily in non-traditional military capabilities, especially modernizing its space capabilities over the last two decades. The most prominent example of this development is that China successfully conducted an ASAT in January 2007.

Though it is accepted that the primary focus of the Chinese military build-up is on Taiwan, the consistent increase in the military capacity is affecting the security concerns of China’s neighbors. These fears have been further aggravated by then-Foreign Minister Yang Jiechi’s comment during a meeting of South East Asian Nations in 2010. According to him,

“China is a big country and other countries are small countries and that is just a fact.”<sup>50</sup> This sentiment is becoming highly relevant in the context of the ongoing disputes in the South China Sea, which have put a huge question mark on the notion of the “peaceful rise of China.”<sup>51</sup>

### *Economy*

China’s economic growth, which largely started in 1978 with the reform and opening of international investment and trade, has transformed the country. By the end of 2010 China had surpassed Japan and become the second largest economy of the world.<sup>52</sup> There are predictions that China may overtake the United States as the world’s largest economy anytime between 2020 and 2030.<sup>53</sup>

This surge in growth has placed China among the top players in the international arena. This strength led some to engage in discussions regarding the creation of the G2 (the United States and China).<sup>54</sup> China has been sceptical of such proposals because it feels it would be forced to undertake international responsibilities that it is still not capable of. Former Premier Wen Jiabao has even stated that China is still a developing country and there is a need for Beijing to maintain a “sober head”.<sup>55</sup> Despite these claims it is clear that the economic might of China has facilitated the entry of Beijing in a number of important regional and global organizations.

### *Socio-Economic Developments*

China started on the path of reform and opening of the economy in 1978. Since its opening, China has witnessed unprecedented economic growth and has successfully transformed itself from an agrarian economy into the “factory of the world.” As a result, the government has managed to lift a

large number of people out of poverty. According to Xinhua News Agency, 250 million Chinese in rural areas managed to get out of poverty by 2011.<sup>56</sup>

Not all of the domestic transformations that China has witnessed in the reform era have been positive. There has been a consistent increase in income inequality both among Chinese citizens, in general, and between the urban and rural populations, in particular. The constant pressure to meet growth targets set by upper-level government officials has also increased corruption and the flouting of government policies. Furthermore, the accelerated growth of the country has caused significant environmental degradation including contaminated drinking water, heavy air pollution, and other severe health hazards. These grievances have culminated in increasingly vocal protests and civil disobedience over the past few years.

There is a need for the government to address these outcries immediately. According to reports, there were 180,000 “mass incidents” in China during 2010 alone.<sup>57</sup> The CCP gains its legitimacy from the fact that it is providing economic growth, but the negative aspects of economic growth can affect the image of the party and cause people to question its authority.

### *Deep Space Ambitions*

China is making consistent efforts to develop its space capabilities. Beijing realized after the first Gulf War that the United States’ ability to launch large scale wars was highly dependent on its space capabilities. In the wake of this realization Beijing has worked relentlessly to achieve a similar space supremacy. As discussed previously, China has achieved a number of milestones in the field. Such actions reveal that China is seriously establishing an alternative to the Western model in every arena,

and examining China's space program, one facet of this development, gives useful insight into China's future.

## **Scenarios**

Based on current developments, the three most likely scenarios for the development of China's space program over the next ten to twenty years are: China as a benign space power, China as an aggressive space power, and China as a failed space power.

### *China as a Benign Space Power*

With consistent development in space technologies and economy, Beijing becomes more secure of its international position and decides to work with other countries to prevent any major disruption in space. The major indicators for this scenario are: successful military technological developments, controlled nationalism domestically, sustained economic growth, stable socio-economic situation, and a focussed movement towards attaining the great power status.

In this scenario, China's space industry becomes a major source of income for the government, and thus the CCP realizes that it would be detrimental to undertake steps which negatively affect the stability of the international order regarding space technology and its use. As a result, China works to prevent other countries from taking adverse actions like jamming or destroying its satellites, and also refrains from engaging in those actions itself. To achieve this goal, the Chinese government works to control domestic nationalism because it would negatively impact China's goal of maintaining free and stable use of space.

China's overall disaster management capacity is raised as a result of the improvement in space capabilities. This will make it possible for China to

share disaster management information with the entire Asia-Pacific region and help its neighbors in the aftermath of natural disasters, for instance. Such assistance would boost China's international clout and encourage China to continue a benign policy line.

If China chooses to collaborate with countries in South East Asia (Vietnam, Indonesia and the Philippines) that are currently in the nascent stages of space technology and with whom Beijing has had disputes with in the past, it would be a major sign that it is developing along a benign path. Space capabilities are essential for improving a number of civilian capabilities, like cell phone technologies, television broadcasting, and disaster management. Such actions would likely be perceived by the South Asian countries as 'goodwill' gestures, and as a result the troubled relationships in the region are mediated. Furthermore, any reduction in the scope and scale of space activities undertaken by the United States could similarly push countries to turn to China for help in the space arena.

In addition, if China agrees to cooperate with Taiwan and Japan in space, that would help reduce tensions and decrease the chance of clashes. The recent meeting between Xi Jinping and Ma Jing-yeou indicates that an improvement in cross-strait relations could be on the horizon.<sup>58</sup> Space relations with India are another factor. Beijing and New Delhi are cooperating on a number of space programs as China decides to work towards a stable and strong Asia. If China decides to put the present land and border disputes on the back burner, closer relations between India and China are likely to develop. It is a necessity for China to maintain positive relationships with its neighbors in order to secure its place as an economic and global superpower. This makes it more likely for China to choose the policy line described above instead of the following two scenarios.

*China as an Aggressive Space Power*

In this scenario China becomes an aggressive space power riding on the success of its space program—particularly if the International Space Station falls into disrepair and the Beidou navigation system replaces the GPS. As the United States space prominence declines as a result of reducing budgets and financial constraints, China emerges as the predominant space power and takes aggressive actions, using space technology to solve its existing territorial and boundary disputes. Such aggressive actions are motivated by China's desire to become a great power and, also, by uncontrolled domestic nationalistic sentiments. The major *indicators* at play for this scenario are: heightened military developments and unchecked domestic nationalism that pushes China to more rapidly attain great power status.

Despite rhetorical and diplomatic opposition to the weaponization of space, China's military planners have reportedly considered how they might attack U.S. military space systems.<sup>59</sup> They have decided to conduct research on specific technologies which will provide China with leverage vis-à-vis the United States in case of a conflict. The present gap between the United States and China is still large in the technological sphere, which has motivated China to focus on targeted developments.

Taiwan has also been a major focus of the Chinese space program. Given the United States-Taiwan military alliance, a crisis in the Taiwan Strait could lead China to become aggressive in space. In a conflict with Taiwan that involves the United States, China would likely use its satellite technologies to locate and target American aircraft carriers. Furthermore, if jamming or other methods of temporary disruption cannot reliably disrupt US satellite activities, outright destruction might be seriously proposed and considered.

Another important development that complements Chinese space prowess is the Chinese Space Station. Beijing has undertaken this process single-handedly and developed the technologies required to manage and operate the space station autonomously, in contrast to the United States' cooperative efforts. Washington is highly dependent on Russia and Japan to keep its Space Station functioning. The successful demonstration of the Beidou system has also placed Beijing in a top position of the space power hierarchy. If such achievements greatly enhance the domestic nationalistic fervor in China, it could lead China to use its prowess in space to push more aggressively for its interests in other arenas.

China and India have a troubled relationship due to unsolved border problems and there is no likely solution in the near future. Even though India is working towards bridging the technological gap with China, in this scenario the gap remains large as Chinese investments in research and development remain significantly higher than Indian investments. If in the future China feels that only a military option is viable for solving the border dispute, it may deploy its power to disrupt Indian space facilities.

China and Japan have an adverse historical relationship. With increases in military strength and domestic nationalism in China, it is somewhat likely that the Chinese government will decide to use its superior space and nuclear capabilities to threaten Japan. China may decide to block the Japanese movement of ships and aircraft by hampering its navigation technologies. This would certainly leave Japan less able to secure its territory, and would be highly likely to lead to a dispute between the two Asian powers.

As explained above, China has a number of unresolved territorial issues (India-China Boundaries, South China Sea, East China Sea, and Taiwan) and the gaining of great power status can help China gain the upper hand when it comes to looking for a solution. India, Japan, and Taiwan all lag

behind China with respect to space capabilities and this gap is going to grow with the passage of time. If in the future the United States does not have the financial power or political will to invest in newer space technologies, this scenario is more likely to develop. In the event of a weakening United States, Beijing might decide to use the space capabilities militarily to settle its existing issues, clearly making it an aggressive space power.

### *China as a Failed Space Power*

China's attempts at attaining space supremacy could also fail if its socio-economic conditions do not support it. Beijing has invested a large amount of resources in building strong space capabilities, believing that space technologies are necessary for its overall growth. However, in this scenario, the Chinese plan does not work out as visualized. The major *indicators* at play for this scenario to unfold are: heightened domestic nationalism, slowed economic growth, and flawed developments in military technologies.

There are two major potential catalysts for this scenario. First, the much hyped manned space mission undertaken by the Chinese could fail, potentially causing the space module to crash while re-entering. Secondly, the Chinese navigation system may not function accurately, ending its potential as an alternative to the United States Global Positioning System (GPS). Either of these failures would greatly reduce the financial gains which Beijing has been receiving as the South East Asian countries stop using the Beidou system (South Korea, Thailand, Indonesia, Singapore<sup>60</sup>) and shift to the GPS. As a result, the Chinese government decides to reduce the amount of funding on its space program.

This failure has direct impact on the domestic situation. The government has been using space achievements to boost the confidence of the people

in the ability of the CCP to rule and take China down the path toward great power status. However, with constant failures the nationalist feelings of the people now turn against the CCP and they blame the party for the repeated failures of the Chinese space program. This would be intensified if Japan or India suddenly see increased successes in the space arena (for example, India concludes a successful manned mission to the moon and showcases its ASAT capabilities in a simulation exercise). As a result, the Chinese government faces a major domestic backlash and the domestic nationalism targets the CCP.

While this is the least likely of the scenarios, if domestic backlash over space becomes strong enough it could lead to overall questions about the of CCP rule. Ultimately, the CCP could be forced out of power as the Chinese people look for other options. If this occurred there would be major concerns about the type of government that would replace the current system and whether it would be strong enough to govern China effectively. With no strong government or ruling authority in China, there is a legitimate fear that the whole region will face instability and turmoil.

## **Conclusion**

The trajectory of the Chinese space program will play an essential role in shaping China's foreign policy and international relations. It also highlights that one cannot view the Chinese space program as independent factor separate from other domestic and international developments. The direction that China takes its space ambitions is linked with the developments in the regional as well as international climate. Any kind of threat perception from the United States (especially with respect to Japan and Taiwan) can encourage China to undertake more offensive route with respect to its space capabilities.

How the world perceives the Chinese space program will also play a crucial role in this direction. Countries like the United States, Japan, and Russia need to undertake more a proactive role with regards to Chinese space program. Such actions will help in building the trust and mutual confidence among the countries and will help avoid any rash and aggressive actions on China's part. It will also reduce the level of uncertainty and opaqueness which is present with respect to such technologies. Even now it is clear that China needs to be more open. Surprises like the ASAT test can only harm its global image of a 'peaceful' power.

In addition, the United States needs to appear to be more encouraging and accepting of the Chinese space ambitions. The only thing which will prevent an aggressive Chinese space power from taking shape is the increased incorporation of China in the international space arena. The more China is incorporated, the less it will be keen on disrupting the existing peace and stability of the space power system. With its technological and financial capabilities China can play a constructive role in the space arena.

## Appendix

**Table 1:** Projections made in the White Papers

White Paper (2000)	White Paper (2006)	White Paper (2011)
<ul style="list-style-type: none"> <li>● Achieve marketization and industrialization of Space applications</li> <li>● Complete the manned spaceflight system and scientific research in the field</li> <li>● Exploration studies in Outer Space</li> <li>● Upgrade the level and capacity of the launch vehicles</li> <li>● Improving the performance and reliance of the 'Long March' group of rocket launchers</li> <li>● Realize manned spaceflight</li> <li>● Establish coordinated and complete national remote sensing applications</li> <li>● Develop the application technology for satellite navigation and positioning</li> <li>● Space explorations centering on the moon</li> </ul>	<ul style="list-style-type: none"> <li>● Improve the carrier rockets' capabilities</li> <li>● Develop an earth observation system</li> <li>● Develop satellite remote-sensing applications</li> <li>● Achieve spacecraft rendezvous and docking</li> <li>● Achieve lunar orbiting probe</li> <li>● Original and important achievements in Space</li> <li>● Continue with manned spaceflight</li> <li>● Continue with lunar explorations</li> </ul>	<ul style="list-style-type: none"> <li>● Improve ground facilities for receiving, processing, distributing and applying satellite data</li> <li>● Expand value-added business in satellite communication</li> <li>● Work on lunar surface landing</li> <li>● Explore the properties of dark matter particles</li> <li>● Continue work on Space debris monitoring and mitigation and spacecraft protection</li> <li>● Promote the satellite application industry</li> <li>● Work on strengthening the national Space law and improve related laws</li> <li>● Work on Space industrial policies guiding and regulating Space activities</li> </ul>

**Table 2: Achievements**

White Paper (2000)	White Paper (2006)	White Paper (2011)
<ul style="list-style-type: none"> <li>• China has developed four types of satellites: recoverable, remote sensing satellites Dongfanghong (DFH), telecommunications satellites Fengyun (FY), meteorological satellites, and Shijian (SJ) scientific research and technological experiments satellites.</li> <li>• First man-made satellite Dongfanghong-1 was launched in April 1970.</li> <li>• By the year of 2000, China had launched 47 satellites of various types.</li> <li>• Developed the Long March rockets independently; China conducted 63 launches and 21 consecutive successful flights between 1996 and 2000.</li> <li>• Launched and recovered the first unmanned experimental spacecraft ‘Shenzhou’ in 1999.</li> <li>• China explored the upper atmosphere with the help of rockets and balloons in the 1960s.</li> <li>• By the mid-1980s, China began to utilize domestic and foreign</li> </ul>	<ul style="list-style-type: none"> <li>• China added Earth resource satellites Ziyuan (ZY) and Navigation and positioning satellites Beidou.</li> <li>• Developed and launched 22 different types of satellites.</li> <li>• Long March rockets made 24 consecutive successful flights.</li> <li>• Research and development of the 120-tonne-thrust liquid/kerosene engine while the development of the 50-tonne-thrust hydrogen-oxygen engine was in progress.</li> <li>• Construction of three launching sites in Jiquan, Xichang and Taiyuan made progress.</li> <li>• Research in space environment and observation, reduction and forecasting of Space debris; and had developed the capability to forecast the Space environment.</li> </ul>	<ul style="list-style-type: none"> <li>• Long March series of rocket launchers accomplished 67 successful launches, sending 79 spacecraft into the planned orbit.</li> <li>• Developed the Fengyun (Wind and Cloud), Haiyang (Ocean), Ziyuan (resource), Yaogan (Remote sensing) and Tianhui (Space mapping) satellites.</li> <li>• Initiated the development of a high-resolution Earth Observation system.</li> <li>• Launched 10 satellites for the Beidou system and provided services to the Asia-Pacific region. (The number as of 2013 was 16 satellites).</li> <li>• Launched and developed the Shijian (Practice) satellites and small as well as micro satellites.</li> <li>• Launched the manned spaceship and achieved Space docking between Shenzhou-8 and Tiangong-1, paving the way for the establishment of a Space laboratory and Space</li> </ul>

<p>telecommunications satellites and developed related technologies. It also began using navigation satellites of other countries.</p>		<p>Station. (China also successfully launched the Shenzhou-9 in 2012 and Shenzhou-10 in 2013).</p> <ul style="list-style-type: none"><li>• Launched the first lunar probe Chang'e-2</li><li>• Building a new launch site in Hainan.</li><li>• Monitored Space debris and provided early warning against them.</li><li>• Removed aging GEO satellites out of orbit.</li><li>• Working on protecting manned spaceflight from Space debris.</li></ul>
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