

2007 ASIA TRIP REPORT

三京 *TOUR*

G. Ryan Faith

The Space Initiatives team at the Center for Strategic and International Studies (CSIS) recently completed a November 2007 visit to Japan and China – two leading Asian space powers. This tour was a follow-on to our earlier March 2006 visit and focused on preparations for the upcoming Global Space Development Summit in Beijing on April 23–25, 2008. Space activity is increasing in profile and tempo throughout Asia, as seen in light of the recent start of exploration programs across the region. Space is becoming an increasingly important topic in both China and Japan, as can be seen in the implementation of new laws and long-term plans. The Space Initiatives Team met with a number of leading people in Kyoto, Tokyo, and Beijing including representatives from government, space agencies, industry, politics, associations, academia, and non-profit organizations. The following is a brief synopsis of our findings.

CHINA

China is making steady and consistent progress in its civil space efforts, marked recently by the October 24 launch its first lunar probe, Chang'e-1, which returned its first images of the lunar surface on November 26. China's space activities apparently continue to generate political interest within China. The Chinese 17th Communist Party Congress (CPC), held October 15–21, was bracketed by the return of the first pictures

of the lunar surface by the Japanese lunar mission, Kaguya on October 9 and the launch of Chang'e-1 on October 24. President Hu's opening speech at the 17th CPC made mention of China's human spaceflight program very early, including it in the discussion of the sustained and rapid growth of China's economy. Also during the 17th CPC, Vice Minister of Science and Technology Li Xueyong reiterated Chinese interest in participating in the International Space Station (ISS), while China's first taikonaut, Yan Liwei spoke on behalf of the involvement of China's Communist Party in space, and the 11th Five-Year Plan for space development – a blueprint for the development of China's and space industry and technology – was reissued.

In recent months, Zhang Qingwei, a space professional and former head of the China Aerospace Science and Technology Corporation (CASC), became the youngest minister in the history of the People's Republic of China with his promotion to Minister of the Commission on Science, Technology, and Industry for National Defense (COSTIND) – the parent organization of the China National Space Agency (CNSA). Finally, on November 9, CNSA Administrator, Sun Laiyan, mentioned the possible passage of new laws in 2008 expanding the range of relationships possible between the government and private sector in space, potentially allowing participation

by academic or private entities in future lunar missions. China is continuing its effort to pursue increased international cooperation for space. Efforts by Europe and China to develop closer ties continued with the signature of an agreement on further cooperation. Europe has also helped China in its lunar exploration program with the decision to allow Chinese use of the ESA (European Space Agency) ground tracking network for Chang'e-1. China's first deep space exploration mission, Yinghuo-1, will travel to Mars along with the Russian Phobos-Grunt mission planned for launch in October 2009. China has also made some preliminary inquiries about cooperation on lunar exploration with India. More recently, CNSA hosted Kaoru Mamiya, Vice President of the Japanese Aerospace Exploration Agency (JAXA) at the launch of Chang'e-1, following the invitation of CNSA officials to launch of Kaguya in September. While ESA was also represented at the launch of Chang'e-1, NASA was unable to send a representative. In Earth Observation (EO), China is continuing its engagement with Brazil on the joint development of hyperspectral sensors for EO platforms. China's advances in space, including their growing ties with other space faring nations, seem to suggest that the application of International Trade in Arms Regulation (ITAR) to space – a U.S. export control regulation originally intended to isolate China technologically – has been effective only in isolating the U.S.

In the last several years, Chinese officials, some of whom have not been speaking in an official capacity, have made a number of comments about the larger goals of China's space program. This has created a great deal of international uncertainty about Chinese plans for future lunar exploration and human spaceflight. Currently, statements from CNSA Administrator Sun Laiyan indicate that China plans a robotic rover mission to the Moon around 2012 and a sample return mission around 2017. More generally, China is starting to take steps to increase the transparency of its civil space program. CNSA gave briefings on China's civil space activities in April of 2006 at CSIS and later at the National Space Symposium in Colorado Springs, in which they indicated that China has plans to land a human on the Moon in the 2025 time frame. Currently,

CSIS and the China Society of Astronautics (CSA) are working on a report on developments in the Chinese civil space program.

Overall, China appears to be standing at the intersection of two potential space races. On the one hand, China is embarking on an ambitious lunar exploration program that is closely matched by Japanese and Indian efforts. This has the potential for blossoming into a full-fledged competition to land a human on the lunar surface. On the other hand, China has been relatively consistent in trying to minimize discussion of a Moon race with the United States. It seems that China would like to be recognized as having matched the feats of the United States and surpassed the accomplishments of the Soviet Union in space without sparking off a competitive race with the U.S. While China's progress has been remarkable, the prospect of a direct race with American space program supported receiving strong high budgetary support would be quite undesirable. Not only would it be extremely difficult for China to beat the U.S., such a race could increase tensions between the two countries. The desire not to engage in a space race with the U.S. shouldn't be misconstrued as the assertion that China will not land on the Moon before the U.S. – rather that China seems to be anxious to decouple their timetable for lunar exploration from American plans. However, the decision to avoid a confrontational race to the Moon with the U.S. is tempered by the Chinese desire to reach the Moon ahead of its counterparts, Japan, India and Europe. The pressure from this competition may spur China's program onward such that it ultimately triggers a race-like response from the U.S.

JAPAN

The Japanese Aerospace Exploration Agency (JAXA), after its 2003 creation from three separate organizations, has produced tremendous technical progress for the country. JAXA, however, remains almost a purely technology oriented space agency, lead by the Ministry of Education, Culture, Sports, Science and Technology – similar to the situation in some other countries, such as France.

Under current space law, Japan cannot deal with either the broader set of national or geopolitical issues associated with space. In particular, there are four sets of issues facing Japan's approach to space:

1. meteoric rise of civil space programs throughout the region,
2. mixed results of cooperation on the International Space Station,
3. growing concerns about security and defense capabilities,
4. an industrial policy lacking coherency and purpose.

The impact of these four influences has been further augmented by past development problems with the H-II rocket family.

In the last few years, this inability to address significant problems stemming from governance issues at the national level has become a critical issue; this is due to China's current activities in space, along with the prospect of a revitalized North Korean ballistic missile and WMD program. These two factors have been the proximate strategic forces driving the overhaul of Japan's space law. Given ongoing governance issues, space activity in Japan is both constrained structurally and challenged by the regional environment.

Today, Japanese space activities are addressed in five different Ministries (and a number of other panels, councils, and bodies):

1. Ministry of Foreign Affairs (MOFA)
2. Ministry of Internal Affairs and Communication (MIC)
3. Ministry of Economy, Trade, and Industry (METI)
4. Ministry of Land, Infrastructure, and Transport (MLIT)
5. Ministry of Education, Culture, Sports, Science, and Technology (MEXT) – JAXA's parent ministry

The practical result of this poor aggregation of authority is the conflicted signals to and from Japan's space activities. JAXA's many technological and scientific contributions stem from its much closer relationship to MEXT. However, even with these impressive contributions, the poor quality of communications, authority, and other linkages between JAXA and the Japanese government has had limited success. Meeting the broader priorities of Japan as a whole is still a significant problem in need of a resolution.

One of the biggest consequences of this fragmentation is that no one player in Japan has a truly comprehensive national perspective of the broader challenges and opportunities for Japan's space efforts. Besides limiting Japan's ability to be proactive in using space for industrial, diplomatic, security, and other areas, the lack of a high-level strategic perspective on space has severely restricted the funding available for Japan's space efforts, which in turn, has limited Japanese space activities, creating even further difficulties in making effective use of space or responding to space-related challenges.

Against this background of extremely diffuse political will for and severe restrictions on Japan's space activities, efforts started earlier this to pass a Basic Space Law (BSL). This legislation would fundamentally restructure and reorganize Japanese space activity. The BSL, which has strong bipartisan support (from both the Liberal Democratic Party-New Komeito coalition and the minority Democratic Party of Japan) is expected to pass next spring, and will focus Japan's space efforts in five areas:

1. Contributing to foreign policy objectives,
2. Contributing to national security needs,
3. Contributing to space industry health and growth,
4. Contributing to national prestige and common national purpose, and
5. Contributing to overall global human development.

Structurally, the BSL should create a Strategic Space Policy Council, headed by the Prime Minister, to provide a forum to build consensus and aggregate political will, action, and resources most quickly at a national level. The Minister of Space Utilization, a post to be created by the BSL, can then implement a nationally coherent space policy that integrates all of Japan's national needs.

The successful passage and implementation of the BSL is of the utmost importance to the viability and health of Japan's future space program. However, while the debate over the BSL – and who will ultimately be in charge of Japan's space program – continues, it is important to remember that while the BSL is an important for the future of Japan's space program, it is not by itself sufficient to tackle all of the challenges Japan must overcome. The BSL will, however, provide Japan with an ability to address these problems and become a major space power.

The first problem Japan must address is its space budget. In terms of the percentage of GDP spent on space activities, Japan spends as little as one half to one third of the amount spent by the United States, India or China. In addition to restraining the scope of Japan's activities, the limited budget keeps production levels running at a minimum. As a consequence, Japanese subcontractors and suppliers can neither obtain the expertise nor maintain the experience needed for basic self-sufficiency. This is a problem which feeds into and compounds existing difficulties with integration of space and industrial policy as well as management of the relationship with the U.S.

The second issue to be addressed is the constitutional and legal implications of using space for intelligence and reconnaissance purposes. The existing legal framework restricts Japan's use of space to non-military use. However, there are some applications, such as navigation, early warning, or remote sensing, which may be permitted within the broader restrictions on offensive military capability. This still may be prohibited under existing laws on space activities. It is possible that this dilemma could require a shift in the current regulations forbidding the use of space for any and all military applica-

tions to a posture which prohibits the use of space for non-aggressive purposes.

The third difficulty Japan's space program faces, is the effective management of its relationship with the United States. On the one hand, cooperation in space has been a topic of discussion in meetings between both President Bush and China's President Hu Jintao and President Bush and India's Prime Minister Singh. By contrast, cooperation in space – particularly since this new burst of activity geared towards lunar exploration – has not been the focus of high-level attention in U.S.-Japan relations. This could be interpreted as providing assistance to Japan's competition in lunar exploration. From this perspective, Japan must be able to obtain more support through a stronger cooperative relationship. On the other hand, Japanese reliance on the U.S. in space has severely restricted its freedom of action to respond to the efforts of other Asian competitors to explore the Moon. Currently, JAXA is experiencing the worst of both worlds – dependency on the U.S. without commensurate support. One possible way forward for Japan is to pursue cooperation under the principle of shared autonomy, in which a country cooperates without developing an absolute reliance on foreign assistance. More globally, while Japan could be more aggressive in obtaining widespread international cooperation with some of its efforts, it is worth noting that JAXA hosted senior Chinese space officials at the launch of Kaguya. In addition to examining cooperative options with China, Japan is also seeking out room for engagement with India. Should two – or even three – of the major Asian space powers start an effective program of cooperation, they will obviously be a major global player if not the main player.

The fourth problem that Japan must address is a complex challenge faced by all the ISS partner nations. In order to meet its stated goal of returning human beings to the lunar surface by 2020, the United States must develop a vehicle capable of transporting crew that can transport crew to the Moon, as well as the ISS, in the 2015 timeframe. With its current and projected budget NASA must retire the Space Shuttle –

and therefore complete the ISS – in 2010. This will create a gap in the U.S. ability to send crew or cargo to or from the ISS until the Shuttle's replacement is fielded. During this period, it is expected that there will be a shortfall in the ability to provide sufficient cargo transportation to the ISS to meet its logistical needs. Japan has an opportunity to address this particular facet of the problem through pursuing use of the H-II Transfer Vehicle (HTV) to supply the station, perhaps even through partnering with an American company to bid as part of the Commercial Orbital Transportation Services (COTS) program for commercial resupply of the ISS. Another facet of this problem relates to the question of returning people and material to Earth. The ability to send crew to and from the station will be restricted to the capability provided by Russia's Soyuz vehicle. The only other existing possibility for sending crew to and from the ISS would be using China's Shenzhou vehicle. However, even with the ability to send and return crews to Earth, neither the Soyuz nor the Shenzhou can return significant amounts of cargo to Earth and current cargo supply ships do not have the ability to safely reenter the Earth's atmosphere. Therefore, experiments which rely on returning samples to Earth for further study and examination will be extremely limited. This restriction on the ability to return samples to Earth will make it difficult for the ISS partner nations to obtain the full benefit of the ISS for research. Further, looking towards the end of the gap in U.S. human spaceflight capability, the U.S. will have to withdraw from the ISS around the 2016 timeframe if it to complete the Ares V vehicle in time for a 2020 Moon landing. The loss of U.S. support will make it difficult for other nations to continue operating the ISS without new sources of support.

If Japan wishes to avoid being overtaken by Chinese and Indian plans for human exploration of the Moon, the country will need to find ways to demonstrate the value of participation in the ISS to its constituents. This will establish a precedent for potentially expensive future human exploration efforts. Fortunately there are a number of options available to Japan that will provide for more flexibility in this direction, including: continued evolution of the H-II family of

launch vehicles, use of the HTV for resupply of the ISS, and use of the ISS as an engineering testbed for the development of a human spaceflight capability.

Over the next decade Japan has extraordinary potential in space exploration and utilization – a strong technological base, an opportunity to restructure its efforts and make space a national endeavor, a large economy, and a resurgent interest in space around the globe. However, the country also faces a difficult path ahead, a challenge that will not be solvable without the healthy and robust implementation of the BSL. This achievement is a crucial step in the advancement of Japan's space program, but one that legislation alone cannot resolve.

CONCLUSION

Sparked in large measure by China's ambitious use of space for strategic and geopolitical ends, and fueled by the U.S. plan to return to the Moon, activity in civil space exploration throughout Asia has been robust and will grow in years to come. Japanese national realignment of its space governance is necessary for Japan to keep pace with Indian and Chinese programs. The transition of these three actors on leading roles in space exploration presents a profound opportunity for space activity around the globe. There is an exceedingly wide array of new options for competition and cooperation throughout not only Asia but around the world; these advancements have the potential to fundamentally alter human exploration. Through careful cultivation, support, and management of these opportunities, we may collectively be able to resume the expansion of humanity's reach after it was so abruptly curtailed with the final Apollo mission in 1972. In efforts to catalyze development of these relationships and opportunities, CSIS will be co-hosting in China a Global Space Development Summit in spring 2008, bringing together leading decision makers from around the globe and across many sectors, representing a wide array of interests. This will begin the process of transforming space exploration from a fragmented effort by individual nations into a globalized, worldwide effort to explore our universe.