# COMMENT

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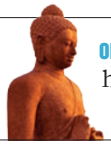

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QUIRKY CHINA NEWS/REX FEATURES

**China's unmanned spacecraft Shenzhou-8, launched in November, aims to dock with the Tiangong-1 space lab module launched in September.**

# Asia's space race

Greater global cooperation is needed to avert the risk of further militarization, says **James Clay Moltz**.

Asian nations are in the midst of an unspoken space race. Although China has captured most of the attention, Japan, India, South Korea and other countries in the region are also expanding their space programmes. Unlike Europe, however, where countries are cooperating within the European Space Agency (ESA), Asian nations are going it alone.

Space activity's close links to national prestige and military operations are part of the problem. Like the superpowers of the 1960s, Asian officials believe that space programmes will bring them status at home and abroad. Asian nations do not want to be seen as 'backward' or, worse, as falling behind their neighbours in science and technology. So they watch one another's space accomplishments closely, and try to match their rivals at every turn.

Tensions in Asian politics underlie today's space competition. Long-festering historical and geopolitical feuds have created hostile dyads throughout Asia: China–India, India–Pakistan, North Korea–South Korea, China–Japan and Vietnam–China, as well as lesser rivalries in Southeast Asia. Unlike Europe and the cold-war-era United States and Soviet Union, Asia has no legacy of regional security cooperation, much less arms control.

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Asia's emerging space race is spurring technological advances in the region. But competing national agendas are fostering scientific duplication, a failure to pool resources, political mistrust and increasing military tensions. These are worrisome trends that are also undercutting accomplishments made by the United States, Russia and Europe in space cooperation. The biggest fear among military analysts is that ▶

Asia's civilian space race will turn into an arms race. Greater cooperation is needed to avert an impending confrontation.

Asia's rise in space can be tracked in the arithmetic of recent launch activity (see 'Asia's space leaders'). Last year, for the first time, the number of launches by China equalled that of the United States at 15, with only Russia ahead of them. In addition, India carried out three and Japan two. Major Asian countries are likely to increase launch activity as they attempt to deploy constellations of precision-navigation and timing satellites for both civilian and military uses.

A recent flurry of Moon missions highlights the competitive goals of Asia's space players. Japan, China and India have all conducted independent lunar-mapping programmes (Kaguya, Chang'e and Chandrayaan, respectively) since 2007. All three countries are planning follow-up missions, including landers, instrumented rovers and lunar bases. Despite this scientific redundancy, no one wants to cooperate and share the prestige from these flights.

*"Asia's space relations cannot be divorced from the broader political climate in the region."*

## RACE TO THE TOP

Although science matters, human spaceflight garners more attention. Witness the international tumult following the flight of China's Shenzhou-5 in October 2003. With subsequent flights of two and then three taikonauts — the latter flight including a spacewalk — China has put others in Asia on notice. Its September 2011 launch of Tiangong-1, the first orbital test module for a space station planned for 2020, has raised the bar even higher.

Japan has more experience in human spaceflight, with 15 manned missions since 1992. It is a member of the International Space Station (ISS), to which it contributed the Kibo research module. Yet all of its flights have been on the US space shuttle or the Russian *Soyuz*. Japan's H-II Transfer Vehicle is now bringing cargo to the ISS. It could be adapted to carry people, but Japan has not yet committed itself to developing the necessary life-support and re-entry technology.

India has felt forced to defend its space reputation in the face of China's rise. It has recently announced that it will launch its own astronauts into orbit by 2016. In preparation, it is working with Russia to train a cadre of astronauts and to acquire the necessary technologies. But this will be an expensive and risky undertaking.

Beyond human spaceflight, all of Asia's major space-faring countries are seeking to develop supplements to the US Global Positioning System (GPS). China is again in the lead, having launched nearly one-third of its planned 35-satellite Beidou constellation. Like the GPS, Beidou will have both civilian and military applications.

Japan is in the process of building a three-satellite GPS-augmentation system called Quasi-Zenith, which will reach throughout northeast Asia. It is seeking buy-in from South Korea to manage costs.

India is planning a satellite network, called the GPS-Aided Geo Augmented Navigation System, to provide services in South Asia. Although there is some cooperation by these countries with the United States, Europe and Russia in this field, none is planned among the Asian systems.

Smaller countries are also joining the fray. Malaysia piggybacked on its purchase of Russian MiG-31 fighter planes to have its first astronaut trained by Russia and flown to the ISS in October 2007. Its rival Singapore is sending engineers and military officers to the United States for training to develop telecommunications and remote-sensing capabilities. Singapore's first domestically produced X-Sat microsatellite achieved orbit aboard an Indian booster in April.

Meanwhile, Indonesia has a well-developed satellite-communications network built with assistance from US and European companies, and in 2007 launched a remote-sensing system, built with Germany, aboard an Indian Polar Satellite Launch Vehicle rocket. Given its favourable equatorial location, Indonesia plans to develop its own launch capability by 2014.

Thailand operates several large communications satellites covering Southeast Asia. It is working with France to develop an Earth-imaging satellite and has cooperative projects with both China and Japan.

Vietnam has constructed a system of ground stations to support its US-built Vinasat-1 communications satellite and is developing its own research satellite, called Pico Dragon. Backed by Japanese development funding, Vietnam is also building a national space centre and an educational programme to support it.

Taiwan keeps tabs on China through a unique cooperative arrangement giving it access to an advanced Israeli imaging satellite as the craft passes through Asia. By 2014, Taiwan will have its own domestically built satellite, Formosat-5, for reconnaissance and Earth imaging.

The Australian government has recently established a new space organization. Its 2009 Defence White Paper announced a major push into space, including plans to develop synthetic-aperture radar capability. Australia has purchased entry into the US Wideband Global Satcom military-communications constellation, and in 2010 signed an agreement with the United States for enhanced cooperation in space tracking.

On the Korean peninsula, South Korea is using Russian Angara boosters in an effort to beat rival North Korea into space. In 2009, Yi So-yeon, a young female chemist, became the country's first astronaut, visiting the ISS aboard a Russian booster. South Korea has also developed infrastructure for satellite manufacturing and remote sensing.

Not wanting to lag behind, North Korea has twice tried to use its missile programme to place a primitive satellite into orbit, both times without success (although domestic propaganda has trumpeted otherwise).

## RISING TENSIONS

Although most of Asia's space participants have focused on developing commercial space applications and military-support programmes such as reconnaissance, communications and navigation, the region's largest militaries are moving into weapons applications, causing global concern.

China's use of a ground-based interceptor to demolish one of its old satellites in January 2007 created more than 3,000 pieces of hazardous orbital debris, most of which will be in orbit until around 2050. Numerous spacecraft — including Chinese satellites — have already had to move to avoid this debris.

In response to this perceived anti-satellite threat, India has formed the Integrated Space Cell to manage its future military space assets, including satellites pledged to each of its military branches. The Singh government has said that it will develop anti-satellite weapons through a direct-ascent, missile-defence programme. This shift from its prior, exclusive focus on the civilian Indian Space Research Organisation marks a significant change in a decades-long peaceful space policy.

Until recently, all of Japan's space activities had to be 'civilian' in nature, according

**ASIA'S SPACE LEADERS**

| Country | Space budget (yearly US$) | Civilian space personnel | Launches per year |
|---|---|---|---|
| Japan | $3.8 billion | 8,300 | 2–3 |
| China | $2.2 billion* | 80,000* | 10–15 |
| India | $1.3 billion | 32,000* | 2–3 |
| South Korea | $220 million | 2,500* | 0–1 |

*Estimated

NASA; SIPA PRESS/REX FEATURES


**Above a cloud-covered Earth, Japan's H-II Transfer Vehicle (left) successfully docked with the International Space Station in September 2009. The following year, South Korea's Naro-1 rocket (right) failed for the second time to launch, crashing just minutes after blast-off in Goheung.**

to a law passed by the National Diet in 1969. But China's military space activities and the desire to monitor North Korean military developments drove the Diet, in 2008, to legislate in favour of military space activities for the first time.

Some senior Japanese officials now state that space-based weapons are conceivable for the nation, provided they are 'defensive' in nature. Japan recently announced a boost in its military space spending — for reconnaissance and early warning — despite ongoing budget woes after the earthquake and tsunami in March.

Ironically, as Asian space tensions have mounted, programmes elsewhere have grown less competitive. The United States and Russia cooperate extensively on the ISS and in commercial launch ventures. But no such peer cooperation exists among Asia's space rivals; instead, their links are skewed. Asia's leading space-faring countries engage with the United States, Europe and Russia to acquire high-level technology and training, but they prefer to work with less-developed countries to promote their own leadership, economic and security interests.

For instance, China hosts the Asia-Pacific Space Cooperation Organization (APSCO), which began operations in 2008. The group coordinates joint space-science and civil-applications research projects such as the Small Multi-mission Satellite, which is used for Earth monitoring.

China hopes that the APSCO will eventually become like ESA, but, to date, its membership comprises the less-developed countries of Bangladesh, Iran, Mongolia, Pakistan, Peru and Thailand.

Japan operates a parallel, but less-formal, organization called the Asia-Pacific Regional Space Agency Forum (APRSAF). The forum's activities include yearly conferences, training and cooperative scientific programmes such as the Sentinel Asia project for regional disaster warning and monitoring. The APRSAF has many regional participants — including a few Chinese institutes — but it is also a way to promote Japan's regional interests. There are no cooperative projects between the APSCO and the APRSAF.

## MORE COLLABORATION

What can be done? Asia's space relations cannot be divorced from the broader political climate in the region. But there are solid technical, economic and environmental reasons for enhanced regional cooperation in space. What is lacking is political will.

Some data exchanges and networking have begun for disaster monitoring and tsunami warning, given recent natural catastrophes in Asia. This could be an area for enhanced cooperation between the APSCO and the APRSAF. Lunar research is another promising area. China, Japan and India are participants in the NASA-hosted Global Exploration Strategy and have expressed interest in joining the data exchanges planned under the International Lunar Network; a joint mission or hosted payload relationship could serve to reduce tensions and foster stronger linkages.

Further forward, a human spaceflight initiative by Japan or China — modelled on the US–Soviet *Apollo–Soyuz* docking in 1975 — could help to foster operational cooperation and personnel exchanges. Such contacts would promote transparency and personal connections among scientists.

Most important is the reduction of military tensions. At present, the major players lack even a basic satellite non-interference pledge like the one that was built into US–Soviet relations in 1972. A regional initiative on this score could help to reverse today's hostile trends. Similarly, the threat of orbital debris could provide the basis for talks on halting mutually damaging kinetic- and laser-weapons tests.

As an experienced and interested observer, the United States might have a part to play. Increased efforts to implement the US government's 2010 call for 'responsible behaviour' in space could be a starting point, perhaps with the United States hosting a dialogue among major space-faring nations. Although the Obama administration faces opposition in the US Congress, initiatives with China in lunar research, human spaceflight or space-traffic management could be used to draw the focus of reluctant Asian actors away from regional rivalry and towards shared, 'humankind' interests and safer norms of conduct in space.

The present course of Asian space activity risks a future collision, both literally and figuratively. Unfortunately, absent a disaster that affects all players or bold new leadership to promote cooperation, the situation seems likely to get worse before it gets better. ■

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