

Rising stars in the East

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Three of the most successful space programs in the world are based in Asia. These are ISRO (Indian Space Research Organisation), CNSA (China National Space Agency) and JAXA (Japan Aerospace Exploration Agency).

ISRO is the Indian Space Research Organisation. The Indian space program started with sounding rockets to study the upper atmosphere; the technology for this was bought from overseas. The Indian Government, however, wanted to foster indigenous technology and Indian scientists and engineers began a program of developing their own rocket expertise. In fact, the entire driving force behind the ISRO was civilian; the intention being to advance Indian technology and infrastructure, manage resources through satel-



Image Credit: ISRO

ISRO Emblem The logo of India's space agency seems slightly inspired by Star Trek's Starfleet emblem.

lites and generally improve the Indian economy. Their rockets became increasingly sophisticated. On April 19th 1975, India's first satellite called Aryabhata was launched by the Russians. The first successful launch of an Indian satellite by an Indian Rocket was in 1980. ISRO engineers have continued to make progress and the new Indian GSLV launch system (Geosynchronous Satellite Launch Vehicle) is capable of placing

a 2.5 tonne satellite into a geostationary orbit and is also capable of launching space probes. Up to now, the entire effort of ISRO has been to produce satellites for the advancement of India—there have not been any purely astronomical or planetary science missions. But this will change; India now has a number of potential planetary missions in the early planning stage.



JAXA Emblem The agency is responsible for Japan's H-2 series of launch vehicles.

JAXA (Japan Aerospace Exploration Agency) was formed in 2003 by the amalgamation of three separate agencies. The Japanese space program had humble beginnings with the solid fuel PENCIL rocket program back in the mid 50s, but by 1970 Japan had successfully launched its first artificial satellite OHSUMI – only the fourth nation to do so, after the USSR, the USA and France. As well as putting weather and communication satellites into orbit, Japan also began to deploy scientific research satellites, in particular for X-ray astronomy. Since the Earth's atmosphere blocks stellar and cosmic X-rays the science of X-ray astronomy could not do much before the 1960s.

More recently Japan was the first nation to successfully send a space probe called Hayabusa to the surface of the asteroid 25143 Itokawa using the new technology of an ion engine. The probe was due to return to Earth with samples of the

asteroid in 2010. However, technical problems with the probe suggest that the samples may not have been collected so it may return empty-handed. The project has still been a tremendous achievement for JAXA.

The Agency also participates in human exploration of space. Japan's contribution to the International Space Station is the Japanese Experimental Module (JEM). Also known as Kibo (Hope), this will be the largest module attached to the ISS and will be carried there in three Shuttle flights starting this year. The module features its own airlock and robot arm for deploying experiments out the ISS's pressurised environment. Japanese astronauts have previously flown on Shuttle and Soyuz missions. For many years JAXA and its predecessors researched crewed spacecraft in the HOPE (H-2 Orbiting Plane, Experimental- the H-2 launch vehicle would have sent it into space) project. This project was cancelled however, and there is unlikely to be a Japanese manned space project in the near future.



Image Credit: CNSA

CNSA Emblem The logo of China's space agency is also oddly similar to the Starfleet emblem.

The CNSA (China National Space Administration) differs from the other two programs in that its roots are firmly in a military background. Chinese rockets were originally developed as delivery systems for nuclear warheads. The original program of developing rockets was strongly linked to the USSR, but political divisions and border disputes between the PRC and the USSR meant that the Chinese program was restarted under the leadership of the People's Liberation Army, Second Artillery Corps. In 1970, just after the Japanese successfully launched



Image Credit: Reuters/Xinhua

Chinese space pioneer Yang Liwei flew on the historic mission of Shenzhou V in October 2003

their first satellite, the Chinese became the fifth nation to launch an artificial satellite using their own launch system. By the mid 1980s they had a successful commercial launch program, which has now put tens of satellites into orbit for various Asian and European countries.

In 2003, China became only the third nation to put a person into orbit when Yang Liwei became the first Taikonaut (Chinese astronauts are called Taikonauts). China has planned human space missions since 1968 but inconsistent government support meant the earlier planned programs were not funded. There has been one further piloted Chinese flight since then and more are planned. China's spacecraft is the Shenzhou, a design heavily inspired by Russia's classic Soyuz but somewhat larger.

Following its first successful manned mission China formally requested to join the International Space Station program (It is technically possible for a Shenzhou to dock with the ISS) but this request was strongly opposed by the Bush administration in Washington. At present, China is considering the possibility of building its own space station, perhaps with other nations as partners. China also wants to continue its manned missions and begin a program of unmanned probes to the moon, with the ultimate goal of a manned mission by 2020 – however financing for this project has not yet been approved by the government. Other future missions include various astronomical research satellites, telecommunication satellites and a possible probe to Saturn.