

China takes first step to put a man in space

by Marsha Freeman

For the past 37 years, placing men into orbit around the Earth has been the exclusive domain of the former Soviet Union and the United States. On Nov. 20, the People's Republic of China took a crucial step toward becoming the third country to be able to carry out a manned space program. At 6:30 a.m. Beijing time, a Long March 2F rocket, developed for China's manned space program, placed the Shenzhou spacecraft into orbit. It completed 14 orbits of the Earth, landing 21 hours after lift-off in the Inner Mongolia Autonomous Region in northern China at 3:41 a.m. the next day.

There had been international anticipation of the unmanned test launch, especially since the spring, when a photograph of the Long March 2F with the spacecraft atop was placed on the Internet. While the Chinese would have preferred to carry out the test in October for the 50th anniversary of the founding of the P.R.C., technical problems delayed the launch.

Made in China

While the Shenzhou resembles the Soviet Soyuz capsules, which carried the first cosmonauts into space, and which basic design is still used today, the Chinese have made significant changes in the systems they first acquired from the Soviet Union. The Chinese spacecraft has two pairs of solar arrays (the Soyuz has one pair), which will increase the amount of available on-board electric power. Shenzhou, at 8.4 tons, is about 20% more massive than the current version of the Soyuz, and it is estimated that the Chinese craft will be able to accommodate a crew of four (the Soyuz has a maximum of three).

The Chinese spacecraft reportedly has a docking system which was built in, even for the first test launch, and an internal transfer system. These two design features will allow China's cosmonauts to dock with another spacecraft, such as a small space station, and to transfer personnel or materials from one to the other internally, without necessitating a spacewalk. The Soviet space program did not have a docking module on the Soyuz until 1971, when the first space station, Salyut 1, was orbited.

The method of the Chinese launch was also different than the Russian program. *People's Daily* reported, according to technical staff members working at the launch site, that the spacecraft was mated to the Long March rocket, the two were assembled vertically, and transported to the launch pad. This

had also been observed through satellite photographs. Integrating the booster with the payload before transport to the pad is similar to the way vehicles are prepared for launch in the United States. The Russians stack the vehicles horizontally, roll them out to the launch site, integrate the vehicles, and then lift them into the vertical launch position at the pad.

Phillip Clark, a British expert, pointed out in the October *Journal of the British Interplanetary Society* that the transport of the new Chinese launch vehicle with its Shenzhou payload in a fully integrated, vertical position, minimizes the time for the vehicle on the launch pad. This will facilitate the rapid reuse of the pad, such as for quick-fire launches during rendezvous and docking missions with two or more spacecraft.

A number of experienced U.S. space experts who have visited China over the last year, report that when they toured space facilities, they were shown simulators and other training devices both for manned orbital flights, and also for space stations and multi-craft operations.

It is known that two Chinese cosmonauts, Li Tsinlung and Wu Tse, spent a year in training in Russia in 1996. In 1998, it was reported that there would be more Chinese cosmonauts arriving for the training course at Zvezdny Gorodok in 1999.

Due to all of the hysteria in Washington, D.C. over the past year, over accusations that the Chinese "stole" rocket technology from the United States, Chinese space officials have stressed the indigenous development of their manned spacecraft. Speaking at the International Space Business Assembly in Washington in early November, Luo Ge, foreign affairs director of the China National Space Administration, insisted that the spacecraft China would soon test "was designed, developed, and produced by ourselves."

To track and receive telemetry from the spacecraft, China had recently put into operation a land- and sea-based monitoring and control network, which includes four tracking ships. The spacecraft itself was developed and manufactured by the China Research Institute of Carrier Rocket Technology, the Chinese Research Institute of Space Technology, and the Shanghai Research Institute of Astronautical Technology. The tracking was done from Beijing by the Aerospace Directing and Controlling Center.

On Nov. 21, after the Shenzhou had returned to Earth, the Communist Party of China, the State Council, and the Central Military Commission sent a telegram to the personnel participating in the unmanned test of the manned spacecraft. It stated that the test's success was attributable to "your efforts in earnestly implementing the CPC Central Committee policy of rejuvenating the nation through technology and education . . . the result of your ardent efforts in bringing the spirit demonstrated by Chinese scientists in developing the country's first nuclear bomb, missile, and man-made satellite, in seeking truth through scientific means, and your aspiration for creativity and improvements." Xinhua reported that this test "once again demonstrates that China is fully capable of independently mastering the most advanced technology."