

China Prepares for Manned Space Flight

by Marsha Freeman

After months of silence from space officials in China, news reports indicate that the third test flight of a Shenzhou space capsule is near, and that overall, the Chinese space agency and aerospace industry are preparing the steps to put their first men into space. The first two unmanned Shenzhou spacecraft underwent test flights in November 1999 and January 2001.

The European Space Agency and Japan cancelled their manned space programs in the 1980s, due largely to budget cuts. They had been developing manned transport vehicles to service the International Space Station. China, which has asked the United States that it be allowed to join the international project but has not been invited, is planning its own independent manned space program. Western, and particularly American, space enthusiasts have been waiting impatiently for the first Chinese astronaut's flight, hoping this will create a "Sputnik" reaction, leading to increased support for the struggling U.S. space program.

In January, *China Youth Daily* reported that flight controllers at the Beijing Aerospace Command and Control Center had improved their skill level for the more complex tasks of flight control, orbit determination, analytic planning and data processing, reentry control, and work with new data display monitors, needed for increasingly complex missions. Data from China's tracking stations and fleet of tracking ships must be processed in real time with great precision, since the unmanned craft are controlled completely from the ground.

But Western observers reported there were signs that the third Shenzhou test launch had been delayed, and this was confirmed on Feb. 26 in the U.S. *Army Daily* newspaper, which reported that a simulated launch had indicated there were technical issues that still had to be worked through. The newspaper also published a photograph of the Long March 2F rocket which will be used to launch the third Shenzhou into orbit.

On March 6, the problems seem to have been overcome, as Hu Shixiang, Deputy Minister of the General Armament Department of the People's Liberation Army, stated at the Ninth National People's Congress that the launcher and Shenzhou spacecraft were at the launch center.

In an interview on March 13, Zhuang Fenggan, chairman of the Science and Technology Committee of the China Aerospace Science and Technology Corp., corroborated that the

original plan had been to launch Shenzhou-3 last year. The 77-year-old aerodynamics specialist explained that mission designers had hoped to improve the interior of the spacecraft for the third mission, but problems arose when the changes were implemented. The team was forced to return to the previous design, delaying the mission to this year.

Zhuang stated, "I personally believe that it is best not to change the spacecraft installation. Even the subsequent Shenzhou-4 and -5 spacecraft should not [have] changes. If every mission has some changes," he explained, "conditions of the space vehicle for each launch are definitely not identical. If such changes are kept up, conditions would be different by the time the manned mission is launched." In that case, he said, "we simply cannot guarantee the reliability of the conditions."

Full Testing

Zhuang explained that the requirement for reliability of the manned spacecraft is very high, and will not be based on calculations, but from verification through full testing. This is also the philosophy that guided the early U.S. development of rockets and manned space systems.

Zhuang said, "Speaking as a technician, when the launch will take place is not important. It is important to guarantee the safe launch and return of the *yuhangyuans* [astronauts]." He added, "After the successful flight of Shenzhou-1, some people had said that the follow-up mission should be manned, to ride on the momentum. We clearly cannot do that."

Zhuang disclosed some of the advances that will be made on the third test flight. There will be a dummy *yuhangyuan* on board, to test the complex life support system. There will be scientific experiments on board, as there were in the second vehicle, and also tests of the safety of the reentry system.

Zhuang was asked why animals, such as monkeys, were not going to be launched on these test vehicles, as they had been in the U.S. and Soviet space programs. He replied that China's approach would be to use dummies that are equipped with sensors. "We want to guarantee the safety of the *yuhangyuans*, much as with the animals," he said.

Regardless of the outcome of the remaining unmanned Shenzhou tests, Zhuang agreed that the first manned mission would surely not occur this year. "Speaking as a matter of principle, we have mastered manned spaceflight technical issues. But a new car that just leaves the factory can suddenly break down on the road. If problems with the spacecraft are not resolved before it breaks down, they could turn into major issues," he said.

Plans for Chinese space exploration when manned flight is under way are also being discussed. Larger, more powerful members of the Long March family of rockets are being developed, to launch a small, 20-ton space station, perhaps starting with a man-tended, rather than permanently occupied, space laboratory. Such rockets could send large-scale telescopes to the Moon and Mars.