



Shenzhou-7 Mission and Beyond -----from Imagination to Reality

Chinese Society of Astronautics



► **Development Course of Chinese Manned Spaceflight**

► **Shenzhou-7 Spaceship Mission and Features**

► **The Future Development of Chinese Manned Spaceflight**

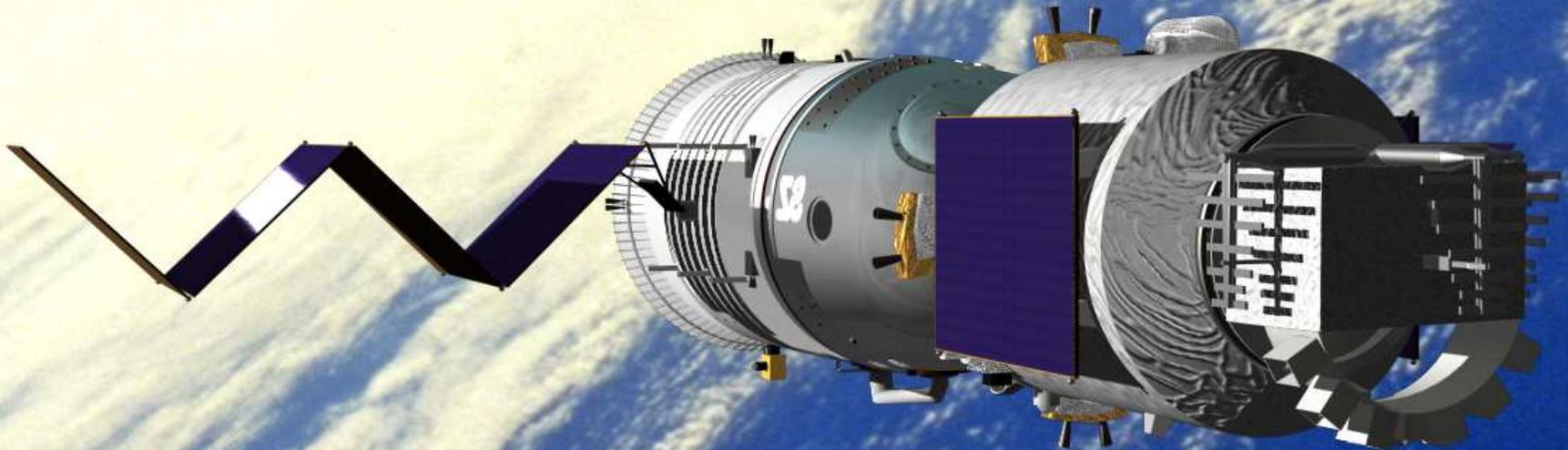
1. Development Course of Chinese Manned Spaceflight

- In 1960s , China began to plan manned space mission and carried out concept study of spaceship. The program was canceled in 1970s due to economy and technical reasons.
- From 1986, with the support of national high-tech program, so called 863 plan, China began to re-consider the possibility of manned spaceflight.
- In the early 1990s , Chinese space technology had been developed rapidly, lighting the dream of spaceflight again.
- On September 21 ,1992 , Shenzhou Project , so called 921 Engineering, was approved, opening a new chapter of Chinese manned spaceflight.
- From 1999 to 2008 , China has launched ,operated and recovered 4 unmanned spaceships, 3 manned spaceships successfully.



Shenzhou-1

- Chinese first unmanned spaceship



At 6:30, Nov .20,1999 , Shenzhou-1 Chinese first unmanned spaceship was launched from Jiuquan satellite launch center, landed successfully in the central area of innermongolia after 21 hours' flight and completion of planned scientific experiment. China achieved an important breakthrough of entering into and returning from space.

Shenzhou-2

- first flight spaceship



- ① At 1:00, Jan.10,2001 , Shenzhou-2 was launched successfully, and returned to the earth after 7 days' flight in orbit ;
- ② Shenzhou-2 is Chinese second unmanned spaceship and first flight spaceship. It is first “complete version” before manned spaceflight, technical configurations is consistent basically with spaceflight ;
- ③ Microgravity experiments of space life science ,material science , astronomy and physics were conducted in Shenzhou-2 and a great amount of test data were acquired ;
- ④ As a independent spacecraft, orbital module stayed first time in orbit to carry out flight test, demonstrate performance of flight system .

Shenzhou-3 and Shenzhou-4

- system demonstration before manned spaceflight



SZ-3

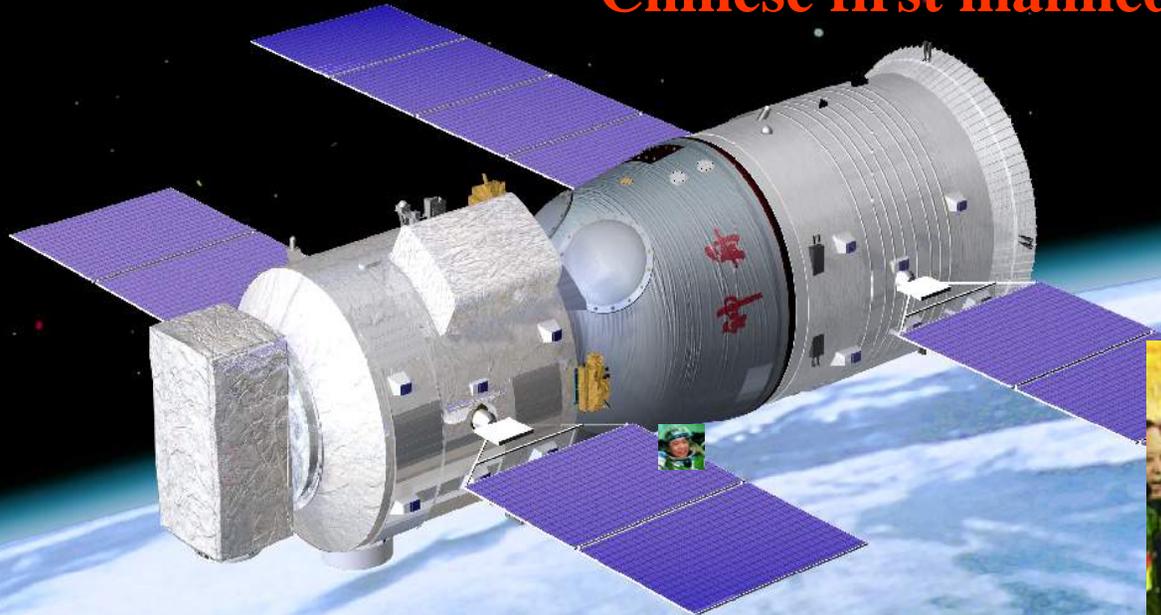


SZ-4

- ① At 22:00, March 25, 2002, and at 0:00, December , Shenzhou-3 and 4 were launched respectively, and returned to the earth after 7 days' flight ;
- ② Shenzhou-3 realized manual control on the basis of automatic navigation and control ;
- ③ Shenzhou-4 was launched successfully in extreme low temperature (-28°C) , it broke record of Chinese launch in low temperature

Shenzhou-5

- Chinese first manned spaceflight



- ① At 9:30, Oct. 15, 2003, Shenzhou-5 manned spaceship was launched successfully, after 14 circle flight around the earth (21h20min), the spaceship returned safely. China realized historical breakthrough of manned spaceflight.
- ② Shenzhou-5 carried one taikonaut. The flight procedure, system performance and taikonaut life environment safety and support ability were examined completely.

Shenzhou-6 spaceship

- Space flight test with multi-crew participation

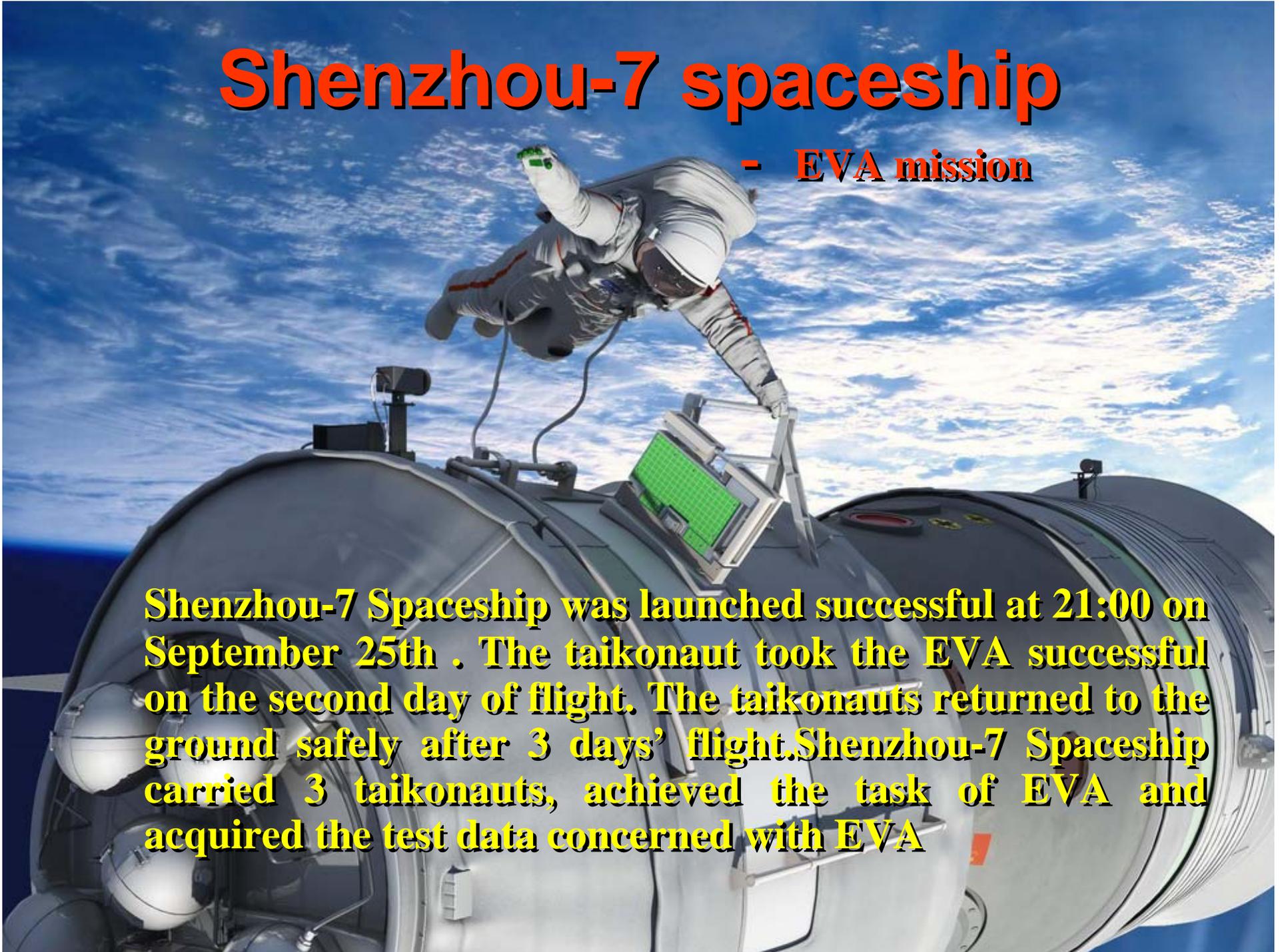
On October 12, 2005, Shenzhou-6 spaceship was launched successfully at 9 am. After 5 days' flight, Shenzhou-6 was successfully returned to the earth. During flight, two taikonauts went out of the recovery module and entered into the orbit module by themselves, firstly realizing manned space test, and achieving the important leap from “one crew, one day” mission to “multi-crew, multi-day” mission.



Shenzhou-7 spaceship

- EVA mission

Shenzhou-7 Spaceship was launched successful at 21:00 on September 25th . The taikonaut took the EVA successful on the second day of flight. The taikonauts returned to the ground safely after 3 days' flight. Shenzhou-7 Spaceship carried 3 taikonauts, achieved the task of EVA and acquired the test data concerned with EVA

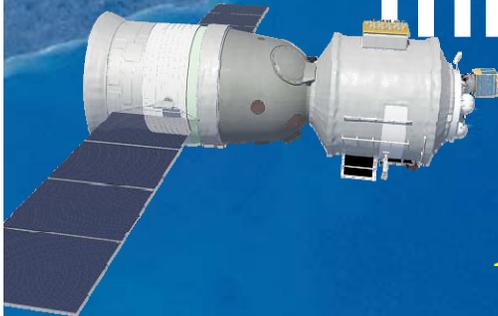


2. Shenzhou-7 spaceship mission and features

Main tasks

As the first spaceship of the second stage of our manned spaceflight engineering, the main tasks of Shenzhou-7 spaceship include:

- ① Continue to carry out flight demonstration of Shenzhou spaceship ;
- ② To implement taikonaut EVA mission, making a breakthrough of EVA technology ;
- ③ To carry out flight test with 3 taikonauts for several days ;
- ④ To carry out data relay satellite link test ;
- ⑤ To carry out small satellite release and formation flying test.



Features of SZ-7 Project

- ① In addition to the basic functions of manned spaceship, Shenzhou-7 spaceship also has three functions: EVA, flight with three taikonauts, support for payload experiment and technological demonstration ;
- ② The main configuration of orbit module is newly designed according to mission requirements, having both functions of EVA airlock and crew habitat module ;





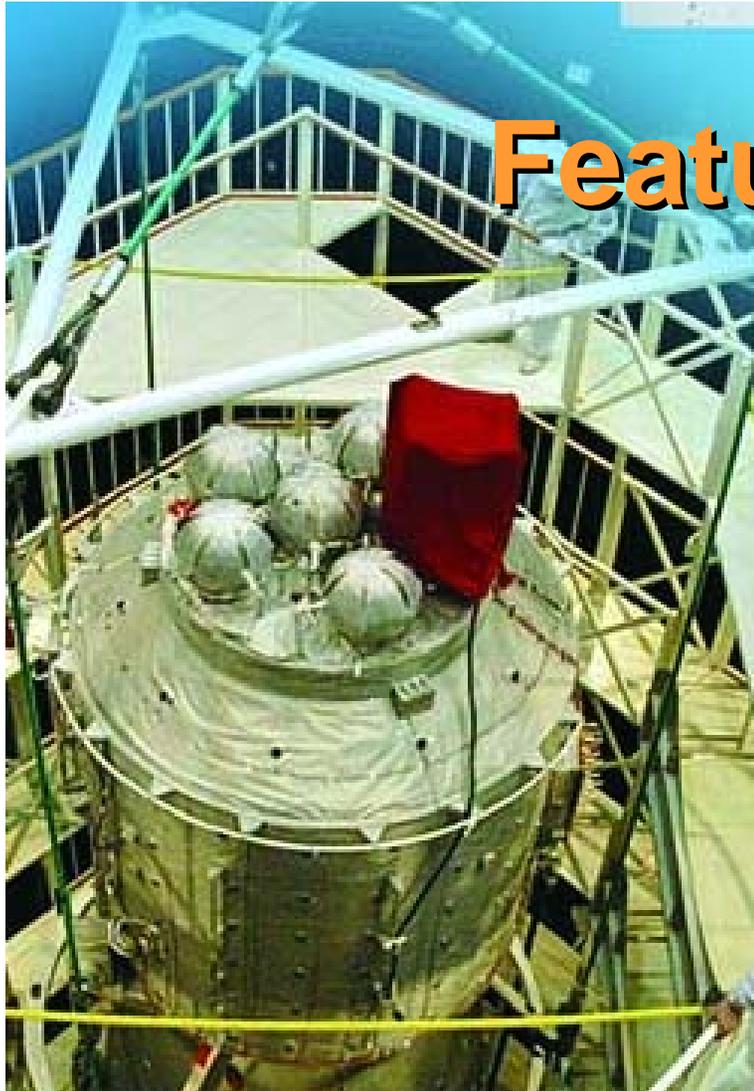
Features of SZ-7 Project

- ③ **As the EVA airlock, orbit module's hatch diameter is enlarged, and some functions are added : depressurization and repressurization, EVA spacesuit support, EVA communications, extravehicle lighting and video recording, etc.;**
- ④ **Recovery module is also the command control module. A set of seat is added, and the environment assurance ability and consumables inside the module are adjusted.**

Features of SZ-7 Project

- ⑤ **Shenzhou-7 carries 3 taikonauts with a flight duration of 5 days at most, operating in a orbit of 350 km, with a orbit period of 91 minutes ;**
- ⑥ **During EVA, one taikonaut stays in recovery module, and other two taikonauts implement the EVA: one carries out EVA in Chinese “Feitian”(means fly in the space) spacesuit, the other in “Haiying” spacesuit provides EVA support in orbit module ;**

飞天

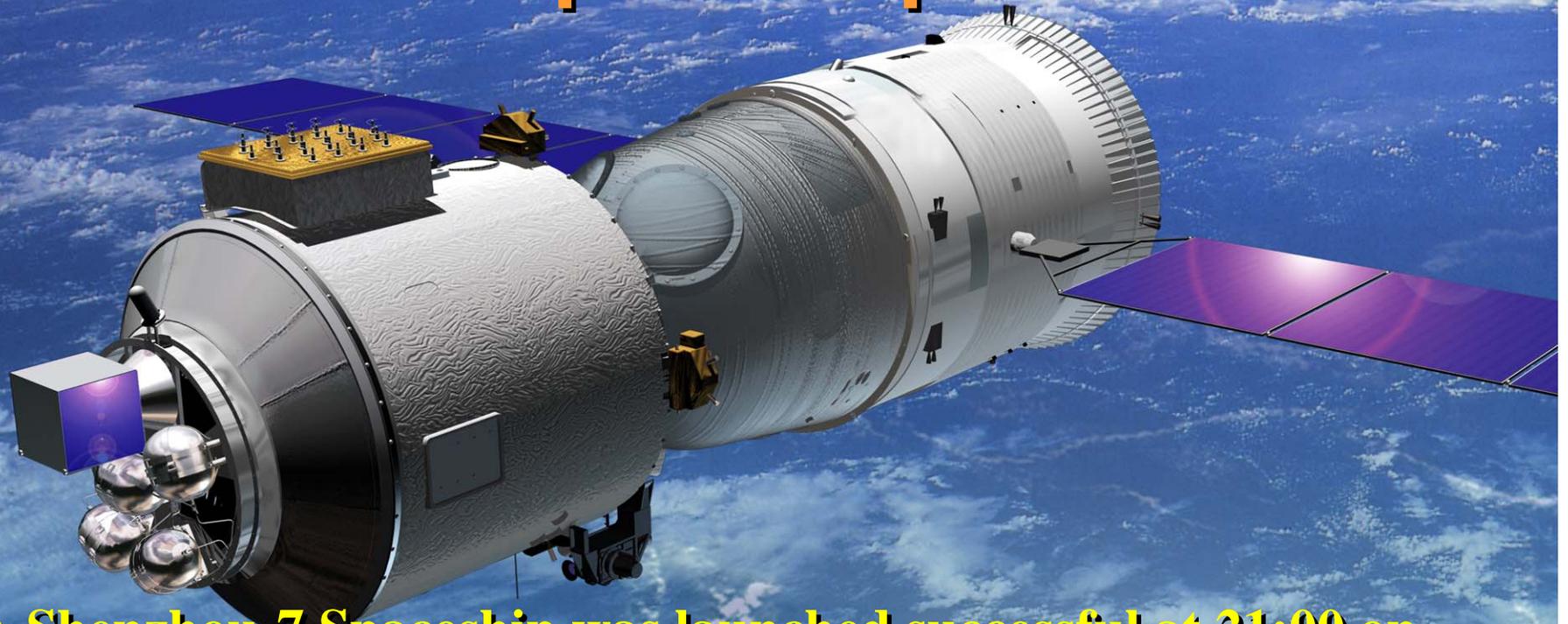




Features of SZ-7 Project

- ⑦ In orbit flight of Shenzhou-7 Spaceship, real-time communication between the spaceship and the earth can be achieved by data relay satellite, TT&C stations and Yuanwang measurement ships.
- ⑧ A small satellite will be released and fly in formation with SZ-7.

Flight Process of Shenzhou-7 Spaceship



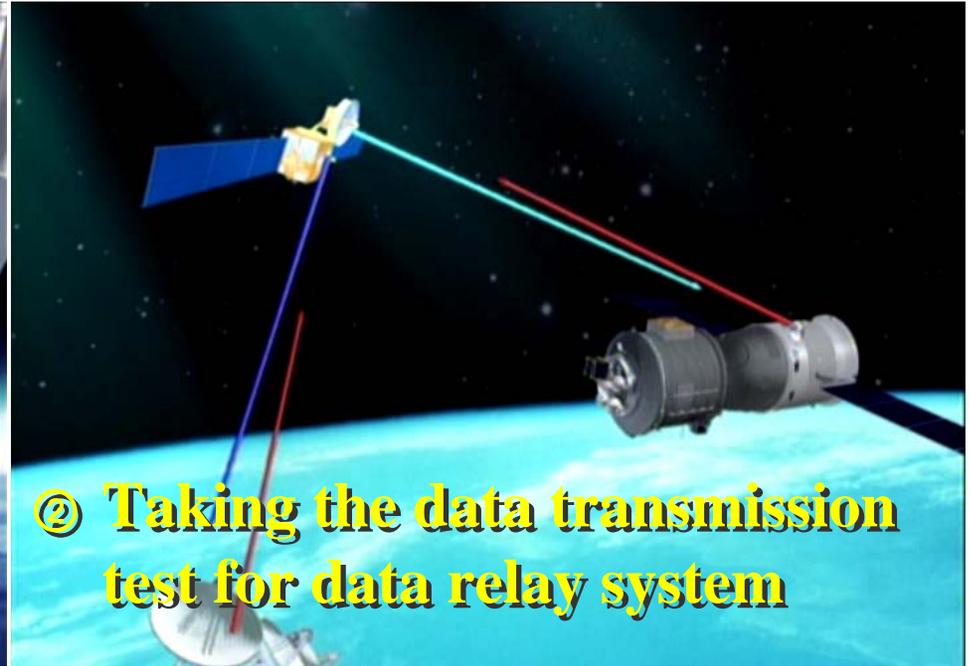
- ① **Shenzhou-7 Spaceship was launched successful at 21:00 on September 25th . The taikonaut took the EVA successful on the second day of flight. The taikonauts returned to the ground safely after 3 days' flight.**
- ② **Shenzhou-7 Spaceship carried 3 taikonauts, achieved the task of EVA and acquired the test data concerned with EVA**



- The assembly, check and in-orbit training of space suit were completed before 19th cycle of the flight ;
- The preparation of EVA was completed from 27th cycle to 29th cycle ;
- EVA was taken from Yansan in 29th cycle to Qingdao in 30th cycle. It lasts about 30 minutes from Taikonaut opening orbit module door to the outside until Taikonaut back to the orbit module and closing the door ;
- The environment recovery in orbit module was completed in 30th cycle of the flight.



① Taikonaut EVA



② Taking the data transmission test for data relay system

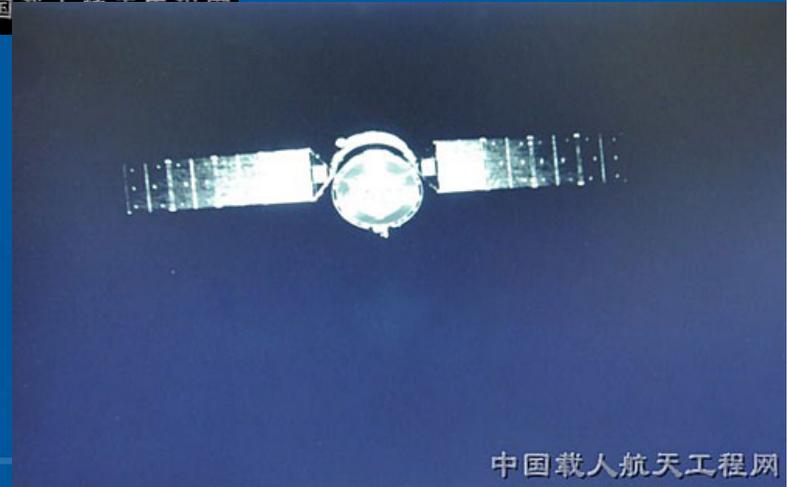
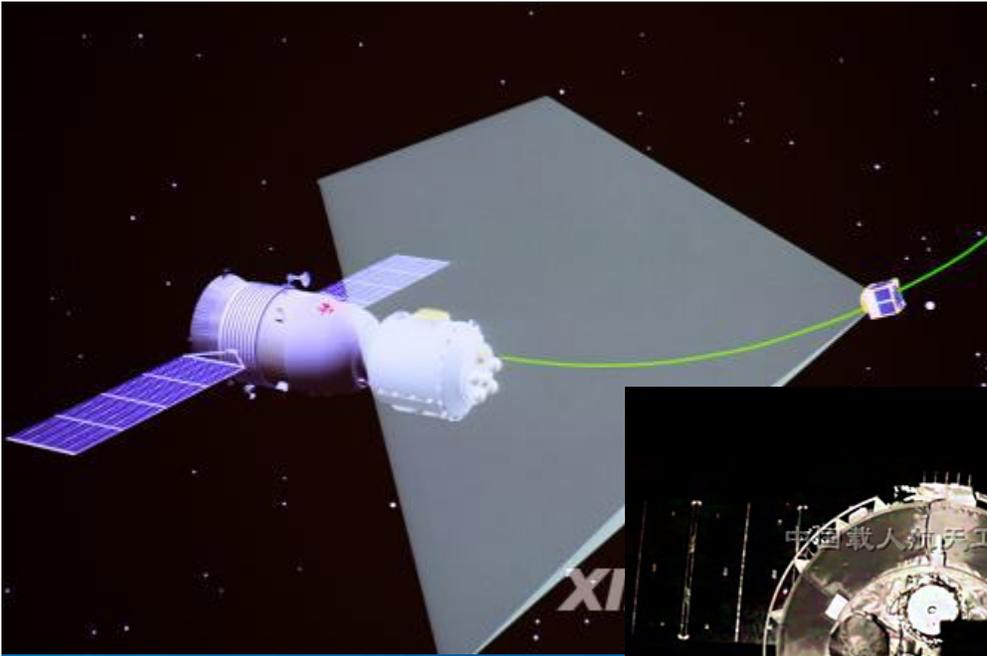


③ The taikonaut took back extravehicle test samples in the period of EVA



④ Small satellite was released from spacecraft in orbit for the first time

Small satellite released and fly with SZ-7



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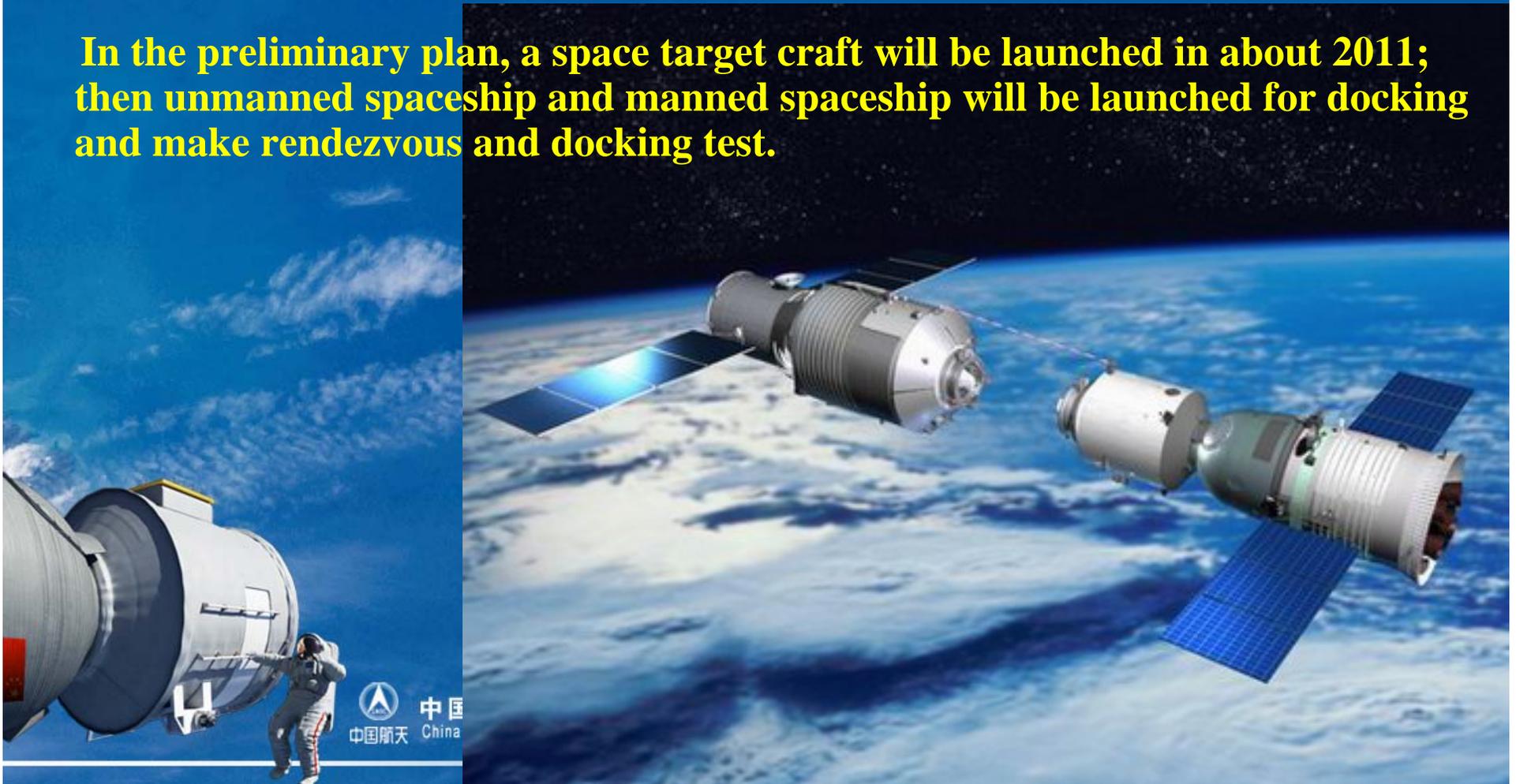
**Shenzhou-7 made a
successful landing at 17:38
on September 28th, 2008**



3. The Future Development of Chinese Manned Spaceflight

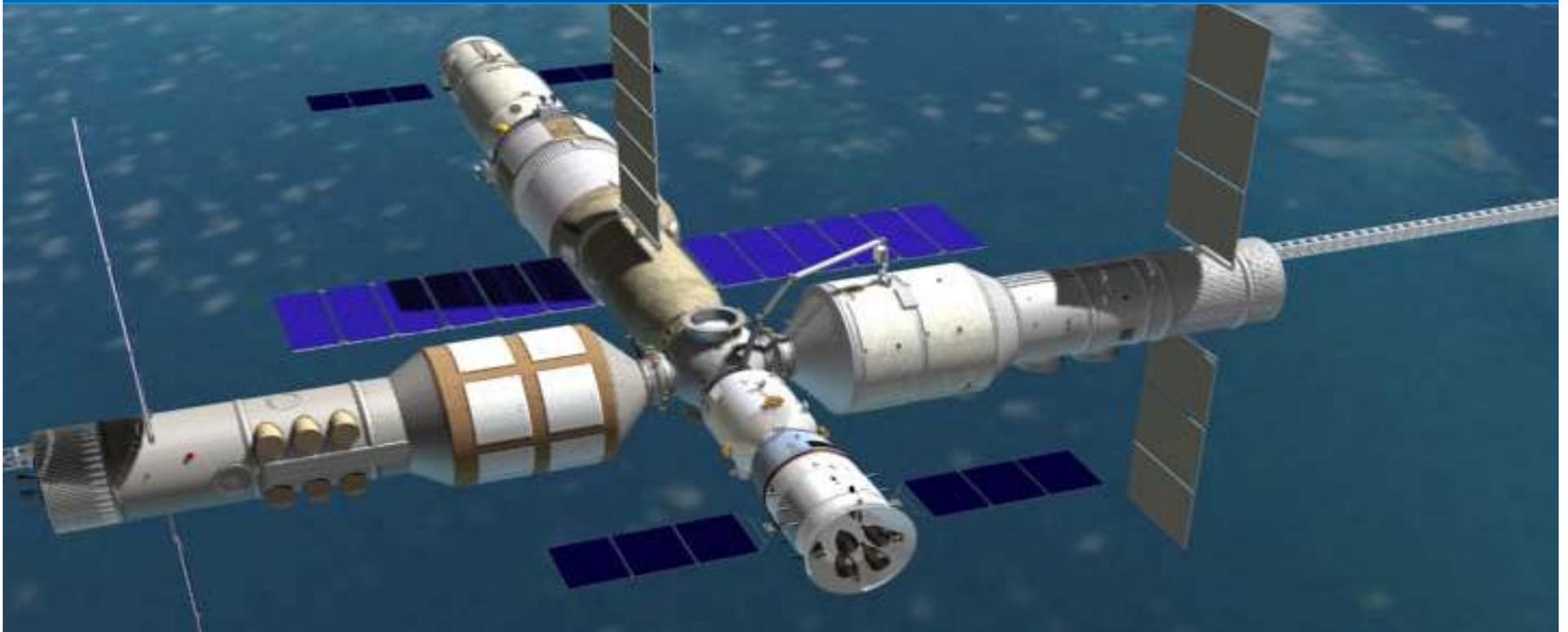
According to the “three-stage” strategy of Chinese manned spaceflight, the rendezvous and docking technology between manned spaceship and spacecraft will be developed after the completion of “Shenzhou-7” task.

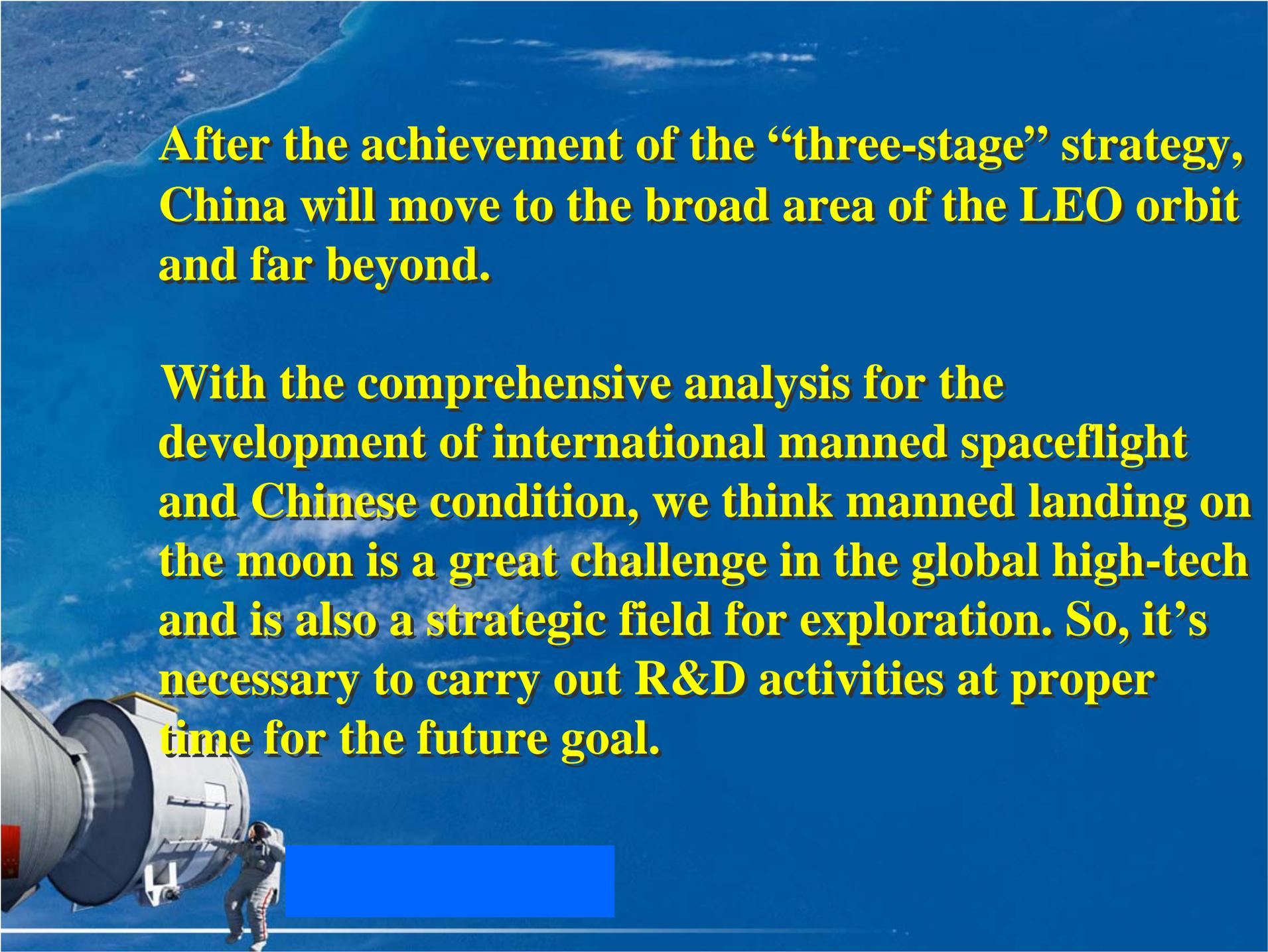
In the preliminary plan, a space target craft will be launched in about 2011; then unmanned spaceship and manned spaceship will be launched for docking and make rendezvous and docking test.



3. The Future Development of Chinese Manned Spaceflight

In the preliminary plan, the manned space station will be established in about 2020 to solve the problem of larger scale space application with manned long-term presence in space.





After the achievement of the “three-stage” strategy, China will move to the broad area of the LEO orbit and far beyond.

With the comprehensive analysis for the development of international manned spaceflight and Chinese condition, we think manned landing on the moon is a great challenge in the global high-tech and is also a strategic field for exploration. So, it’s necessary to carry out R&D activities at proper time for the future goal.





Thank you!

