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## New rocket to be partially reusable

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China's next-generation rocket designed to carry astronauts will be multifunctional and partly reusable, according to a senior rocket scientist.

Wang Xiaojun, president of the China Academy of Launch Vehicle Technology, the country's major maker of carrier rockets, told an international forum in mid-February that the new rocket, which has yet to be named, will have two models.

The first model will consist of a two-stage core booster and will be used to transport astronauts or cargo to China's Tiangong space station, while the other will have a three-stage core booster and multiple side boosters and will be tasked with carrying astronauts to the moon.

The first model will be able to send 14 metric tons of payload to the low-Earth orbit in which the Tiangong station is travelling. The second model will be capable of carrying spacecraft weighing

about 27 tons to an Earth-moon transfer trajectory, a gateway for lunar landings, Wang said.

The first two stages of their core boosters will be basically identical while there will be a third stage on the moon-landing rocket, he said.

The first stage of the models will be reusable, Wang said, explaining that the component will have a controlled, powered landing with its own engines and will be captured by a special recovery net.

Wang's remarks were made at the International Symposium on Outlook and Cooperation on Near-Earth Orbit Human Spaceflight on Feb 17 and were published by China Aerospace Science and Technology Corp last week.

The virtual conference was co-hosted by the Chinese Society of Astronautics and the International Astronautical Federation.

Chinese space industry engineers have been working to make their rockets reusable for several years and have made substantial

progress via technology demonstration tests.

Jiang Jie, a senior rocket designer at Wang's academy and a member of the Chinese Academy of Sciences, said research and development of the reusable variant of the Long March 8 rocket are proceeding well.

She said designers are developing an integrated first stage for the reusable variant. It will consist of a core booster and two side boosters. Instead of breaking up and falling back to Earth like the first stages of all previous Chinese rockets, the new core and side boosters will stay together and make a powered landing at a preset landing site or a recovery platform at sea.

The only reusable rocket that has entered operational service is SpaceX's Falcon Heavy, which made its maiden launch in February 2018.

All boosters on the US rocket's first stage can be recovered and reused as they separate from each other before controlled reentry and landing.

## One rocket, one launch, 22 satellites

China's Long March 8 rocket set a new record at the Wenchang Space Launch Center in South China's Hainan province on Sunday, when a rocket lifted off with 22 satellites, which were later released in space.

The technology behind a single rocket lifting off with multiple satellites inside is a difficult one, as all the satellites must be stacked subtly apart inside, like "passengers" in a very crowded vehicle.

The design of the rocket must be such that the satellites inside do not touch or block each other in the release process.

Also, when the rocket reaches its release point, the doors must open to let the satellites emerge. The tim-

ing is controlled so that the satellites have ample time and do not collide with each other. During Sunday's launch, the 22 satellites were released in 12 rows.

In 1981, China sent three satellites into orbit with one single rocket launch, thus becoming the third country in the world to have mastered the technology. Even today, only five countries and the European Space Agency have the technology.

More satellites are needed to cater to the demand of various sectors, from remote communication to weather forecasting, even automated driving. Starlink, which is part of billionaire Elon Musk's SpaceX project, plans to launch

40,000 satellites. Some of the satellites launched by SpaceX are even smaller than a coffee mug or book, but they still need a rocket to propel them into space first.

The more satellites China can send with a single rocket launch, the more competitive it will be. That means China has a long way to go in the "single rocket, multiple satellites" technology.

On Jan 24, 2021, SpaceX's lone Falcon rocket released 143 satellites in space, setting a new world record.

But thanks to the efforts of Chinese scientists and engineers, China might break that record one day soon.

—ZHANG ZHOUXIANG, CHINA DAILY