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## Structural details of Long March 9 revealed

By ZHAO LEI  
[zhaolei@chinadaily.com.cn](mailto:zhaolei@chinadaily.com.cn)

Chinese rocket researchers are now definite on the overall structural design for the nation's super-heavy carrier rocket, known as the Long March 9, a project insider said on Wednesday.

Gu Mingkun, a senior rocket designer at the China Academy of Launch Vehicle Technology, the country's leading rocket maker, said at a news conference that the baseline model of the Long March 9 will be a large, three-stage rocket about 110 meters tall.

It will have a liftoff weight of about 4,000 metric tons and thrust power of nearly 6,000 tons. The diameter of its core stage will be about 10 meters, he said.

According to the designer, the rocket will be powerful enough to transport spaceships weighing up to 50 tons to an Earth-moon transfer trajectory for lunar missions, such as the construction of a large-scale science outpost or mining.

It will also be able to send spacecraft on deep-space missions, including an ambitious venture to place Chinese astronauts on Mars, Gu said.

In addition to the baseline model, the structure of another model for spaceflights to low-Earth orbit has also been determined by researchers, he said.

The second model will have two stages, which means it will be shorter than the baseline one. It will be capable of deploying spacecraft with a combined weight of 150 tons to a low-Earth orbit hundreds of kilometers above the ground, the designer added.

The rocket's first stage, which has the strongest lift power, will be reusable on both models and extensively reduce operational costs, he said.

Once Long March 9 enters operation, its carrying capacity will be more than five times that of Long March 5, currently China's most powerful rocket.

"The super-heavy rocket will greatly help expand mankind's reach inside the solar system, establish a shared future in outer space for all people and extensively boost the unity and confidence of the Chinese nation," he said.

"Its design and manufacturing work will inject momentum into a number of engineering fields including the advanced high-performance materials and key electronic components."

Currently, the biggest and most powerful rocket in service in the world is the Space Launch System, a super heavy-lift model developed by NASA. The SLS, which took its maiden flight on Nov 16, also has multiple configurations.

Gu made the remarks at a news conference in Beijing held by China Aerospace Science and Technology Corp, the country's dominant space contractor and the parent company of Gu's academy. The event was held to launch the Blue Book of China Aerospace Science and Technology Activities in 2022 and make public the company's future research and development plans.

## Rocketry expertise used in artificial lung

By ZHAO LEI  
[zhaolei@chinadaily.com.cn](mailto:zhaolei@chinadaily.com.cn)

Chinese rocket engineers have used their knowledge of space vehicles to design a new type of extracorporeal membrane oxygenation (ECMO) machine that has the potential to save many lives.



An ECMO machine developed by RocketMedical. PROVIDED TO CHINA DAILY

The National Medical Products Administration, China's top drug regulator, announced on Tuesday evening that it has approved emergency use of the second domestically developed ECMO device, the Huisheng I, which was produced by RocketMedical, a subsidiary of the Beijing Institute of Precision Mechatronics and Controls.

The machine will improve patient access to ECMO support, help meet urgent demand for such devices and improve the treatment of patients badly ill with COVID-19, the administration said in a news release.

ECMO is the extracorporeal technique of providing prolonged cardiac and respiratory support to persons whose hearts and lungs are unable to keep them alive. Also known as an artificial lung, the device is often used as a last-ditch treatment for patients exhibiting critical organ failure, and is believed to play an important role in treating serious cases of COVID-19.

"The parent organization, the Beijing Institute of Precision Mechatronics and Controls, is known for developing the servo motors used on the Long March carrier rockets. Servo motors help manipulate and fix a rocket's position, direction and trajectory during flight. They make use of controlling motors, pump valves, axle bearings as well as magnetically levitated parts, parts also key to building an ECMO device," said Xu Jian, general manager of RocketMedical.

Xu said that having become aware of the demand for the devices and the gap in supply following the outbreak of COVID-19, RocketMedical decided to take advantage of the institute's expertise to design a new one. Development started in the summer of 2020.

To test the device, RocketMedical worked with a number of top hospitals, including Peking Union Medical College Hospital and the People's Liberation Army General Hospital, on animal experiments and then clinical trials on aged patients with severe symptoms, Xu said, adding that the results were satisfactory and testify to the device's safety and effectiveness.

"Its chief capabilities and functions are on par with those of its international peers. Moreover, it is much lighter and more movable than imported devices, allowing for convenient transport and quick use," he noted. "Its operating system is more friendly to Chinese doctors and nurses because it is simpler to use."

Currently, the Huisheng I has entered small-scale production.

The first domestic ECMO machine, made by Chinabridge Medical in Shenzhen, Guangdong province, was cleared for use by the National Medical Products Administration on Jan 4.

Previously, all membrane oxygenators on the Chinese market were made by foreign companies, primarily German manufacturers.

By late December, China had more than 2,600 ECMO machines, according to the National Health Commission.