



## Planning growth

Central authorities unveil measures to boost rural consumption **POLICY REVIEW, PAGE 6**

## Tourism offers Kashgar fresh opportunities

**YOUTH, PAGE 16**



## Harvest ensured

Ministry expands scope of two types of agricultural insurance **BUSINESS, PAGE 13**

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## Microwave makes space station feel like home

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The three astronauts in the core module of the Tiangong space station may have escaped Earth's gravity, but one chore has followed them into orbit — housework.

The jobs of cooking and cleaning never let up, but technology is helping keep them well fed and their temporary home tidy.

In what passes for a kitchen in their cramped quarters, the astronauts have a microwave oven specially designed for use in space, which was carried by the space cargo craft Tianzhou 2 on May 29.

Other appliances include high-tech vacuum bags that safely store waste and kill bad odors.

But eating is the first order of business for hungry space station residents.

[See Space, page 4](#)

## Space: Around 120 kinds of food available for astronauts

[From page 1](#)

"The oven was designed to provide healthy food for astronauts in the core module of the space station — to help them prepare nutritious and satisfying food," said Li Feng, an engineer with the Galanz Group's research and development department.

The microwave in the module has been modified to cope with conditions experienced during the mission. "During the rocket's liftoff, the oven needed to withstand high-frequency turbulence. It's expected to work continuously for 10 years in space," Li said.

The oven has a more efficient magnetron, the internal device that generates microwaves, and a special power supply to reduce its weight. "We had to optimize the product's structure and improve its mechanical strength by adopting innovative technologies because the space station has extremely strict restrictions on the specifications and weight of facilities and supplies," Li said.

There are around 120 kinds of food available for astronauts' meals on the space station.

More than 20 varieties of food, including *songzi* (traditional Chinese sticky rice dumplings), spiced bean curd, fried noodles with shredded pork, bamboo shoots and brown sugar glutinous rice cake are all on the menu, according to Zhoushan Daily, a newspaper in Zhejiang province, where the meals were packaged.

Other Chinese produced high-tech innovations are in the module to help make the astronauts' lives more comfortable.

Guangdong Baili Technology Group, which specializes in vacuum technology, has developed special bags to deal with trash. "In view of the weightless environment, vacuum storage bags are a necessary convenience," said Wang Zhenchang, chief engineer at the Baili Group.

Soiled clothes, food packaging and other waste items are classified and carefully collected in a device designed for the purpose, Wang said. Garbage containment is a serious health issue in space as bacterial pathogens floating in the air can threaten the astronauts' health.

Finally, to keep things organized, there's the "space pen".

In a video of the astronauts working in the cabin of Shenzhou XII, which carried them to the module, a pen floating in the air attracted the attention of netizens.

The so-called space pen, which can function in zero gravity and extreme temperatures, from -40 C to 100 C, was made in China by a private company, Creative Wealth, in Shaoguan, Guangdong.

The pen's cartridge uses ink with a high viscosity and a pressurizing device to enable the astronauts to record information quickly. The pen, the first of its kind to be made in China, was also used during the Shenzhou X mission.

*Chen Meiling in Beijing contributed to this story.*