

Skate expectations

Short-track squad keen to put on show for home fans **SPORTS, PAGE 20**

Global efforts key for 6G innovation

BUSINESS, PAGE 13

Looming threat

Bologna's medieval leaning tower at risk of falling down
WORLD, PAGE 10



CHINA DAILY

香港版
HONG KONG

中國日報

www.chinadailyhk.com HK 130

WEDNESDAY, December 6, 2023

Country aims to shine in space-based solar power tech to boost clean energy

By ZHAO LEI
zhaolei@chinadaily.com.cn

Amid global efforts to replace fossil fuels with clean energy, Chinese scientists and engineers are working on a bright idea — soaking up abundant energy from the sun and then beaming it back to Earth.

Multiple teams in China are currently focused on technologies needed for building and running a space-based solar power facility, which will allow the sun's energy to be captured on orbit, something that isn't possible from Earth, said Hou Xinbin, a senior researcher at the China Academy of Space Technology in Beijing and a member of the Committee of Space Solar Power of the Chinese Society of Astronautics.

After collecting solar energy, the space facility will convert it into electromagnetic radiation, such as microwaves, and laser beams and send it wirelessly back to the Earth's surface. Receiving stations will then turn these electromagnetic waves and laser beams into electricity for distribution to power grids, according to Hou, who is also a member at the Permanent Committee on Space Solar Power of the International Academy of Astronautics.

"My colleagues at several domestic institutes and I have proposed a technology demonstration mission to the country's space community, and are hoping it will happen in the near future," Hou told China Daily in an exclusive interview last month in Beijing, on the sidelines of an international space industry forum.

"As a key step to verifying the feasibility of space-based solar power generation, we want to make and place into orbit a pair of satellites — a large one that will collect solar power and convert it to microwaves and laser beams, and a smaller one responsible for receiving laser beams. Meanwhile, a ground station will be in charge of receiving the microwaves. The two satellites will form an in-orbit test-

“My colleagues at several domestic institutes and I have proposed a technology demonstration mission to the country's space community, and are hoping it will happen in the near future.”

Hou Xinbin, a senior researcher at the China Academy of Space Technology

ing system for wireless power transfer," he said.

According to the scientist, it is quite difficult to beam laser power to Earth, but it is easier to realize the link between satellites in orbit or between a satellite and a celestial body because of the vacuum.

"Realizing laser power transmissions is meaningful in terms of space programs. For instance, a solar power satellite with laser transmission capability can operate in a lunar polar orbit and provide power supply to exploration programs in polar regions on the moon," he said.

However, a host of technical issues must be solved before any commercially viable solar power project can take shape in space, Hou said.

The challenges include developing high-performance components with acceptable sizes and weights — these cannot be too big or too heavy — and insulating them into a satellite and also ensuring that the power beams reach ground receiving stations with great accuracy, he said.

"In the long term, we need to fig-

ure out how to transport large, heavy parts to orbit and then assemble a colossal power station," he added.

Hou noted that there is an urgent need in China to develop new sources of clean energy, which are sustainable, affordable and secure, and can be widely used, as China has announced that it aims to peak carbon emissions before 2030 and realize carbon neutrality before 2060.

Pang Zhihao, an expert on space exploration technology and a renowned spaceflight writer, said that space-based solar power stations are a very attractive solution to energy shortages and pollution.

A space-based facility will be able to harness sunlight around the clock without being affected by factors such as the atmosphere and weather, potentially yielding eight times more power than solar panels at most locations on Earth, said Pang, who worked at the China Academy of Space Technology for decades.

In addition, the power generated in this manner is unlimited and clean, adding that this source of energy could also be used to power any spacecraft within its beaming range.

First proposed in 1968 by Peter Glaser, a Czech-American scientist and aerospace engineer, the concept of an orbital solar power plant has been a popular aspiration among spacefaring parties such as the United States, the European Space Agency and Japan, but technological and financial hurdles limited its development until recent years.

In May 2020, the US Naval Research Laboratory conducted its first test of solar power generation in a spacecraft.

In January 2023, the California Institute of Technology launched an experimental satellite called the Space Solar Power Demonstrator, which has successfully beamed detectable power to Earth.

Construction begins on weather satellite network

By ZHAO LEI
zhaolei@chinadaily.com.cn

Cultivate Space, a Beijing-based private satellite company, has begun construction on a meteorological satellite network, according to a company executive.

The first satellite in the network, Tianyan 16, was launched on Tuesday by a Ceres 1 carrier rocket from the Jiuquan Satellite Launch Center in northwestern China's Gobi Desert.

The Tianyan 16 is a meteorological satellite equipped with passive microwave detection equipment. Working in a low-Earth orbit of about 500 kilometers, it can measure the vertical layers of atmospheric temperature and humidity, and can also survey precipitation, sea surface pressure and the structure of typhoons.

Yu Weixue, chief technology officer of Cultivate Space, told China Daily after the launch that in the near future, the company wants to deploy a total of 45 meteorological satellites, including the Tianyan 16, in orbit to form a vast space-based network. All of the satellites will have similar devices like those on Tianyan 16.

"Upon the network's completion, it will be able to obtain global data in only 30 minutes," he said.

"We have planned to launch three satellites via a single rocket

flight before July 2024. If everything goes according to plan, another three satellites will be launched before the end of next year. All of the new craft will join the Tianyan 16 to establish a network."

The main payload on the Tianyan 16 satellite, a microwave radiometer, has an operational frequency of more than 100 gigahertz and a very high level of sensitivity, which means it is the best of its kind in China and boasts world-class capability, according to Yu.

"Data obtained by the spacecraft will help with early warnings for typhoons, downpours and other extreme weather events and will also support research on climate change. After in-orbit functional verification, it will start formal operations and its data products will mainly be used by meteorological authorities," the researcher said, noting the satellite can scan the entire Earth in a matter of several hours.

The Ceres 1 rocket used for Tuesday's launch was designed and made by Galactic Energy, a private rocket maker in Beijing.

Galactic Energy has undertaken 10 successful orbital launch missions with Ceres 1 rockets, far outperforming its private competitors in China. The flights have placed 35 commercial satellites into orbit.