Tiansuan Constellation:
an Open On-orbit Satellite Network Experiment Platform

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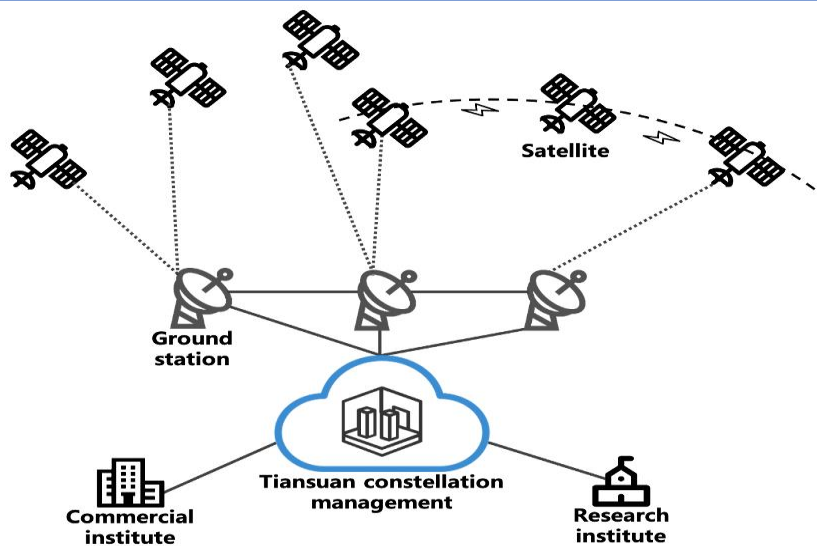# Background

- Satellite network has become a global hotspot

- This exciting development is taking shape rapidly in the industry, while the research community is urgent to do some leading research to bridge the connectivity divide.
- It is urgent to conduct experiment evaluations on real satellites. However, this is difficult because of high bar of space technology, such as deployment cost and unknown risks.

■ Building an open research platform facing research need, based on industry-university-research and application

Communication

Computing

Satellite operating system
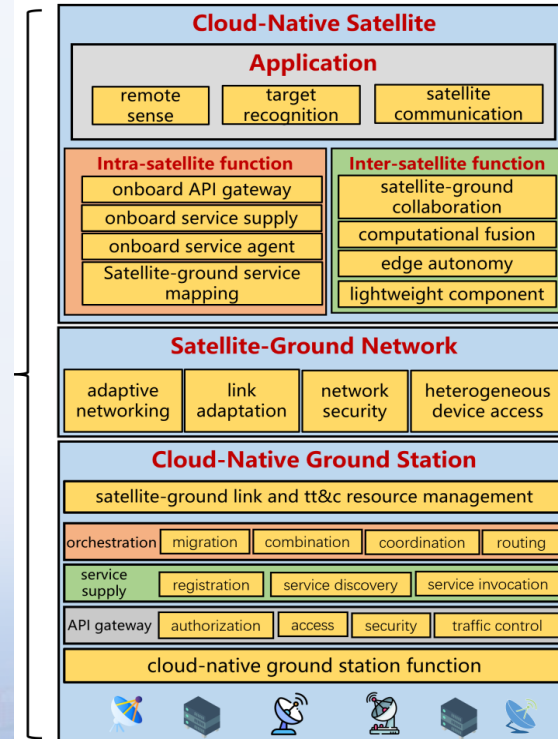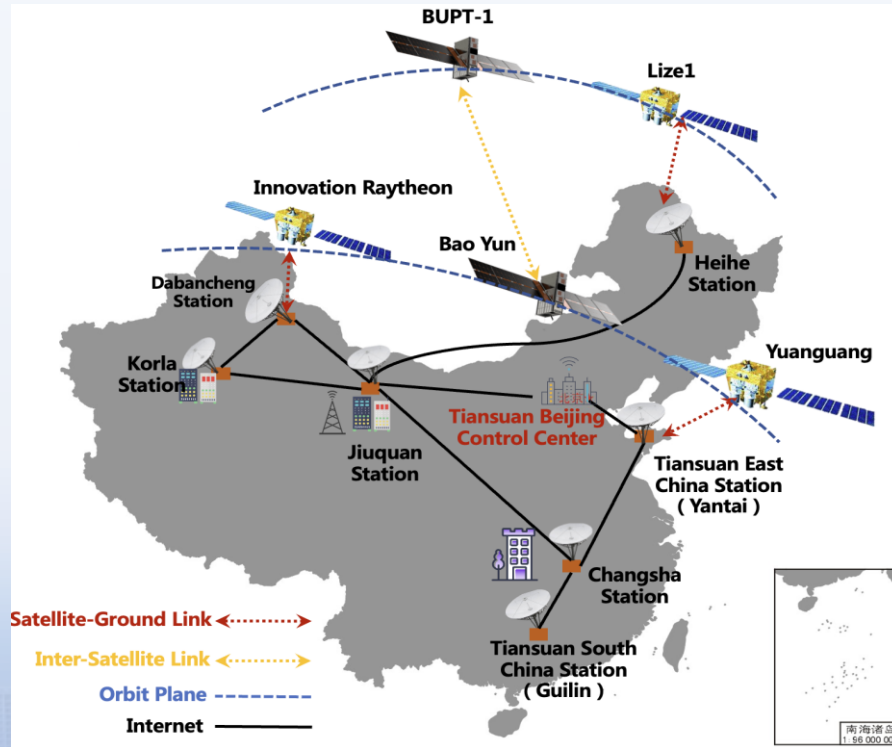
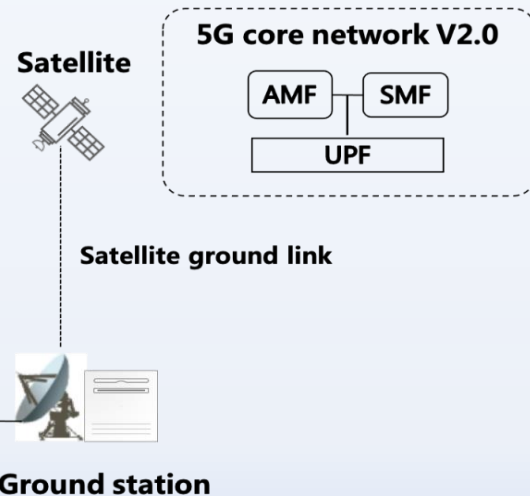Security and reliability

Hardware testing

■ www.tiansuan.org.cn

R. Xing, et al., From Earth to Space: A First Deployment of 5G Core Network on Satellite, China Communications, 2022, https://arxiv.org/abs/2210.05405

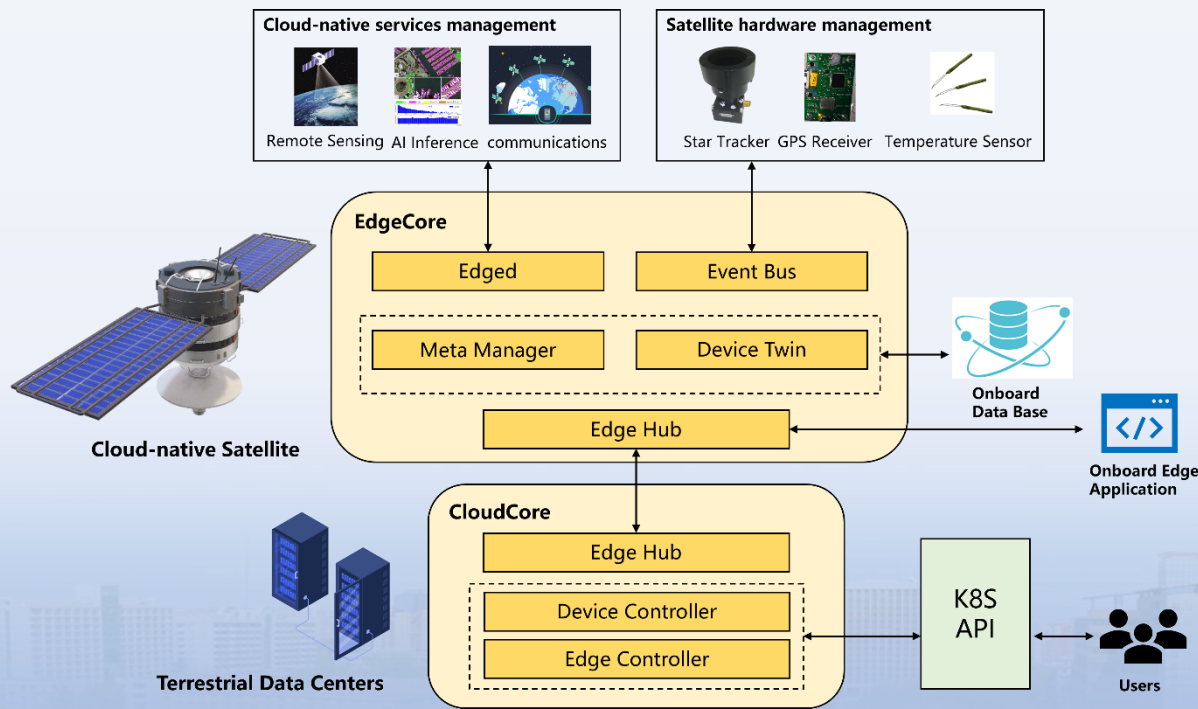The world's first in-satellite 5G core network system deployment in China
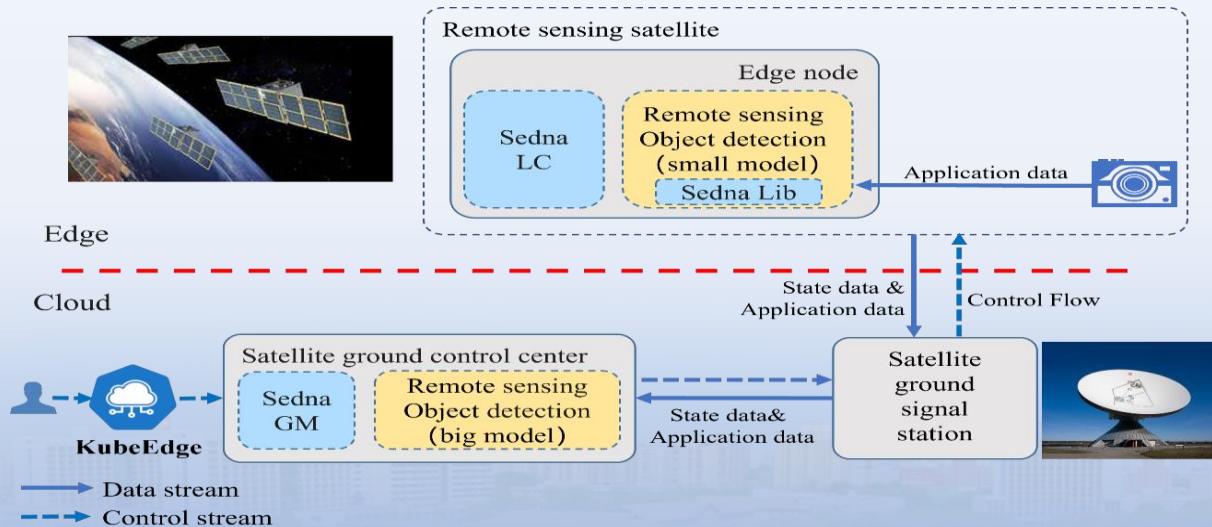
■ BUPT and Huawei Cloud jointly developed the world's first cloud-native satellite platform

■ In remote sensing scenarios, the identification accuracy of ground targets in orbit is improved by more than 50% through in-orbit cloud detection.

■ Through in-orbit calculation, the amount of data returned by the satellite is reduced by 90%

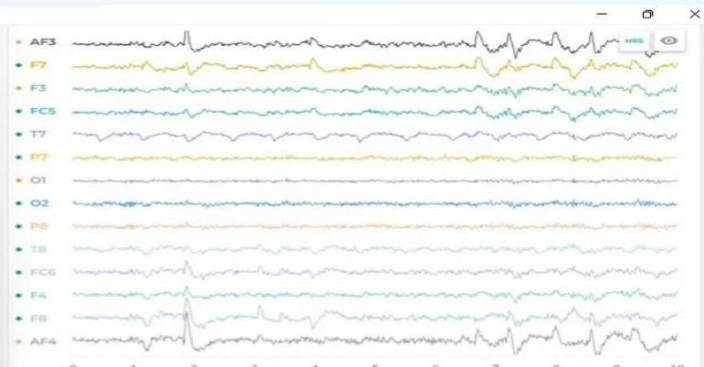| Accuracy rate	Recall rate
99.13%	99.07%

The benefits

• Improve the accuracy of area statistics
• Reduce satellite energy consumption
• Slow down the satellite-earth traffic
• Reduce transmission costs

- Controlling satellites via brain-computer interface
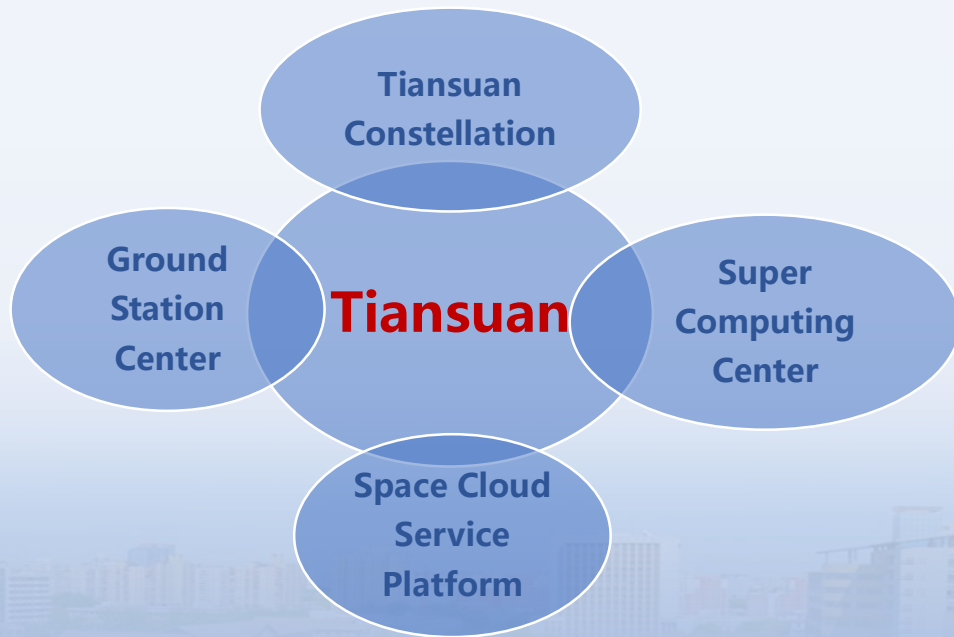
Support networking experiments

- Satellite edge computing
- Satellite network performance measurement
- New protocols for satellite network
- New access technology for satellite network
- New applications on satellites
- ......

Tiansuan platform allows any registered users to submit their experiment code directly to real satellites!

■ A public, web-based, unified platform that provides services to third-party researchers and practitioners

Thanks!

Shangguang Wang

http://www.tiansuan.org.cn